THE NEWSWEEKLY FOR THE COMPUTER COMMUNITY

COMPUTERWORLD

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The group that recently agreed to purchase a major portion of Memorex for $550 million was not the lone bidder. Telex Computer Products was inter-

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Feds sound Red alert on data

Strict measure lacks definition, critics claim

By Mitch Betts

WASHINGTON, D.C. — The Reagan administration has ordered all federal agencies to identify sensitive information held in government computers — including a broad range of economic, technical and personal data — that must be protected with stringent computer security measures.

The policy reflects the administration's view that government computers and data communications need increased security to protect them from penetration or interception by foreign adversaries such as the Soviet Union, as well as domestic hackers, criminals and terrorists, government sources said.

But critics said the definition of sensitive information is too expansive and will lead to restrictions on access to government information by U.S. citizens.

John M. Poindexter, the president's national security advisor, issued a policy memo earlier this month defining a new category of "sensitive but unclassified" government information that must be protected from disclosure or tampering.

In addition to unclassified information about national defense and foreign policy, the new category covers "economic, human, financial, industrial, agricultural, technological and law enforcement information" stored in government computers. Also covered are confidential personal information and commercial proprietary information supplied to the U.S. government.

According to testimony at congressional hearings last year, sensitive information might include such government data as files on hazardous materials transportation, Federal Reserve monetary policy, flight safety, Securities and Exchange Commission records and Social Security Administration records.

"This definition is overly broad, way beyond national security," said Jerry J. Berman, legislative counsel at the American Civil Liberties Union last week. "Although

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IBM stirs 386 stew with user prototypes

By Douglas Barney

Reports of early sightings of IBM 80386-based prototypes last week have added intrigue to the growing controversy swirling around IBM's strategy for assuring its dominance in the microcomputer market.

ANALYSIS

Some industry watchers say IBM is being forced to hasten the announcement of its own micro based on the speedy Intel Corp. 80386 chip because of the early success of its competitors' 80386-based machines. Compaq Computer Corp. last week announced the sale of its 10,000th Deskpro 386 unit, indicating that at least some users are refusing to wait for an IBM machine. The Compaq machine was introduced in September.

IBM is facing a critical juncture in its dominance of the microcomputer market. To fight the loss of market share to clone makers, IBM's 386 generation will require certain proprietary features. Such features take time to develop and have prompted speculation that an IBM 386 machine is up to a year away.

However, waiting that long presents a risk that IBM

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ISDN passes first real-world test

By Elisabeth Horwitt

PHOENIX — After at least five years of development work and prototyping on vendors' premises, the first operational Integrated Services Digital Network involving customer premises equipment was successfully tested last week.

In two initial tests, Arizona government officials transmitted both voice and data between their offices through a Northern Telecom, Inc. ISDN digital switch residing on Mountain Bell's Phoenix central office.

One of several prototype ISDN networks that have been planned during the next few months by regional holding company U.S. West, the trial "is important because its first-time customers get their hands on ISDN technology for real-world applications," said Howard Garvey, Northern Telecom Integrated Network Systems' vice-president of marketing.

The trial also offers participating vendors the opportunity "to evaluate ISDN technology and determine customer benefits outside the research lab," said Mountain Bell Marketing Vice-President Bob Hawk. Customer premises equipment used in the trial is still in the prototype phase, however. No time frames for introducing commercial offerings were discussed.

In the first of two ISDN applications demonstrated at a news conference, Don Cline, Mountain Bell's Arizona vice-president and chief

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CW SPECIAL REPORT

Answering skeptics, DB2 thrives in production systems

By Charles Babcock

Deere & Co. uses it for its parts inventory system. The Port Authority of New York and New Jersey uses it for human resource applications. American Hoechst Corp., a New Jersey pharmaceutical firm, uses it for a production tracking system.

All three rely on DB2, IBM's relational data base management system, for production systems, and they are typical of a growing number of IBM customers, despite skeptics' claims that DB2 is not ready for such tasks.

IBM now advocates that DB2 be put into production use, having launched it as an information center-type product. But more significantly, corporate users are finding they cannot get to where they want to go without a DBMS with relational qualities. In that fledgling field, DB2 is selected by many as the safest bet.

Just how far the production use of DB2 has advanced is difficult to say, but several observers say it began to grow after the 10% to 25% performance boost in Release 2 last February.

"We saw a fair amount of activity last year," says Nancy K. Mullen, Arthur Andersen & Co.'s manager of data base consulting at the company's Chicago headquarters. Since Release 2, "there has been an explosion of activity," she says.

"I get a very strong sense that companies are putting important applications — payroll, personnel, benefits — onto DB2," says Elizabeth Dahab, a member of the steering committee of the Knauer DB2 User Group in New York and a DB2 consultant at The Port Authority.

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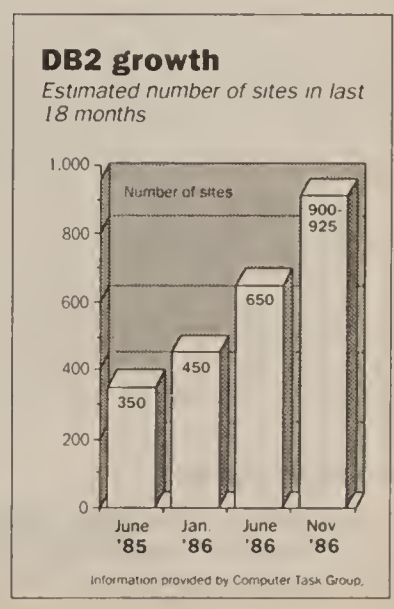

MITCHELL J. HAYES

NEWSPAPER

IBM tries parallel processing

Accelerator focus of multiprocessing effort

By James A. Martin

FORT LAUDERDALE, Fla. — Limited details of IBM's 4-year-old parallel processing research effort were aired last week as company officials described how they are examining the potential and pitfalls of that technology.

Officials of IBM's Engineering Design Systems (EDS) division have been developing a hardware accelerator to speed communications among microprocessors via multiple data buses without sacrificing each processor's performance. Speaking at the 11th annual IBM University Study Conference here, the engineers said they hope to improve their understanding of the complexities of multiprocessor environments.

EDS has been working on the hardware accelerator project to determine how it can bring as much power as possible to the design workstation. There are no plans, however, to develop any specific products from this experiment, according to Roger E. Peo, EDS advisory engineer.

"Design automation problems are growing faster than mainframes," Peo said. "We wanted to build an accelerator with high-performance capacity, one that was flexible enough so we could look at the entire spectrum of problems that logic designers face."

A goal in the project was to develop an accelerator that offered optimum random-access memory (RAM) address space and minimal response time between data buses. The accelerator consisted of standard parts such as 17 Motorola, Inc. 68010 microprocessors so that EDS developers would be free to use conventional programming tools, Peo said.

Although communications between processors is necessary to take full advantage of parallel processing, those communications slow the processors' speed, which at optimum level is less than 1 million instructions per second. As a result, each processor requires at least 2M bytes of RAM in order to maintain speed.

Instead of an operating system, the accelerator uses a monitoring system that acts as a management resource. "We wanted to send and receive messages between processors and establish the configuration of the accelerator. The user, with this monitor, can tell how many processors are available on the accelerator," Peo said.

Although Peo would not elaborate on software application programs developed for the accelerator, he said such programs were designed using object-oriented programming, which enables users to break one job into many and send those tasks to different processors. Being able to distribute tasks from one job to multiple processors is the key advantage of parallel processing, Peo added.

Although the majority of IBM research projects outlined at the conference are not scheduled to become products, research and development is vital to U.S. companies and should be a major vendor focus, attendees said. "With technology changing every six months, it's worth it to experiment as much as possible," said Nils Sedwick, academic center support coordinator for Cal Poly, formerly California Polytechnic State University in San Luis Obispo.

High tech, universities find joint projects help both stay competitive

By Amy Sommerfeld Fiore

FORT LAUDERDALE, Fla. — Forming a close partnership between a university and industry in computing research can mean the difference between technology leadership and obscurity for both the company and the college.

That was the theme of the 11th annual University Study Conference, held here by IBM's Academic Information Systems (Acis) group last week.

The conference brought together representatives of more than 300 universities from 36 states and seven foreign countries to show off the latest in university computing techniques.

"The need to stay competitive applies to universities as well as industry," said George B. Beitzel, IBM senior vice-president in charge of Acis. "In the 1980s, institutions of almost every kind are . . . compelled to compete in the market in order to survive."

Competitive position

"Technology is a clear player in giving these universities an advantage," said John Daily, general manager of Acis. Universities and colleges do not measure their competitive positions in terms of market share or the bottom line the way a business does but gauge their success by the quality of students and faculty they can attract, according to Daily.

"Traditionally," Daily explained, "[A faculty candidate] would ask, 'How big would my lab be? What equipment would I have?' Now they ask the same questions but also, 'How much computer equipment comes with the lab? How many personal computers are here? How many terminals are networked? Will I have access to a supercomputer?' "

IBM's Acis arm funded much of the research presented at the conference through unrestricted grants and joint study programs, in which IBM contracts with the university for a specific research project and supports the work with equipment and cash.

Among the projects presented at the study conference were an expert system for configuring local-area networks, a programming language for natural language processing and an environment for developing portable academic software on 32-bit workstations.

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DG aims revamped office system at DEC

By James Connolly

WESTBORO, Mass. — Data General Corp. last week supplanted its Eclipse MV/4000 DC office system with a version of its Eclipse MV/7800 that supports more users with more power and memory than the MV/4000 DC.

The Eclipse MV/7800 DC is an office-environment version of the 4-month-old MV/7800. It uses the same CPU board as the MV/7800 but needs no special power source or ventilation.

The MV/7800 DC provides less expansion capability, with only seven slots rather than the 14 slots available in the original 7800.

In DG's product line, the MV/7800 DC, which supports up to 35 active office automation users, will bridge the gap between the entry-level Eclipse MV/2000 DC and the MV/7800, DG said.

"The 4000 DC will continue to be made for those customers who want it. But the 7800 DC effectively picks up where the 2000 DC leaves off and covers the range of the 4000 DC and beyond. So we don't anticipate a lot of demand for the 4000 DC," said Gordon Haff, DG's product manager for the MV/7800 and MV/7800 DC.

Targeted at business mart

The MV/7800 DC is targeted at the departmental and small business markets and is designed to fit under a desk.

"The MV/7800 DC is ideally suited to Data General's fully integrated CEO software, which allows high performance with fewer memory requirements than competitive office automation solutions," said J. David Lyons, vice-president of group marketing for DG.

The MV/7800 DC provides for 48 asynchronous connections, compared with 32 for the MV/4000 DC, and 14M bytes of memory, rather than the 8M bytes in the MV/4000 DC. The departmental system reportedly processes one million instructions per second, which is the same power provided by the MV/7800.

> ***'The 4000 DC will continue to be made for those customers who want it. But the 7800 DC effectively picks up where the 2000 DC leaves off and covers the range of the 4000 DC and beyond.'***
>
> — Gordon Haff
> Data General Corp.

However, the MV/7800 DC only has 1.2G bytes of disk storage, rather than the 9.4G bytes supported in the MV/7800.

Scheduled to be available within 60 days, the basic version of the MV/7800 DC costs $28,400 with 2M bytes of memory, a multifunction I/O controller, a 737K-byte diskette, a 70M-byte hard disk drive and DG's AOS/VS operating system.

Analyst Kimball Brown of Dataquest, Inc., a San Jose, Calif.-based market research company, said the MV/7800 DC is DG's answer to certain Digital Equipment Corp. Microvax II models and to the Wang Laboratories, Inc. VS 65.

"What Data General will be offering is a 10% price advantage over their competitors' products. They usually have come out later with their products but with that 10% advantage," Brown said.

Reversal of OEM move

Analyst Richard Mikita of International Data Corp., a Framingham, Mass.-based market research firm, noted that the announcement of a departmental processor seems to be a reversal of a move toward an OEM concentration illustrated by the July MV/7800 introduction.

"It is interesting that they are emphasizing the departmental version again. We seem to be getting mixed messages from DG," Mikita said.

"For a while, it appeared that they were breaking away from the departmental strategy. For a while, everything had been aimed toward the department. Then the 7800 seemed more OEM-oriented, and now they are emphasizing a departmental system again," he said.

Feds sound Red alert on data

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it's discretionary for agencies to decide what information falls into that category, I think there is implicit pressure on the agencies to act, or perhaps overreact, to make access to government information more difficult," he said.

U.S. Rep. Jack Brooks (D-Texas) had previously questioned whether national security agencies should dictate computer security policy for civilian agencies. Poindexter's memo, however, does not go as far as critics had feared, because it allows the head of each federal agency to decide what types of information fit the new security category and what level of security is necessary to protect it.

Computer security directive

The new policy was spawned by Reagan's controversial computer security directive, called National Security Decision Directive 145 (NSDD), which established the new "sensitive but unclassified" category [CW July 8, 1985]. The directive also triggered a Pentagon effort to prevent Soviet access to economic and technical data available from on-line data bases [CW, Nov. 17].

"It's helpful to have a clear, single definition of sensitive but unclassified information as we work to develop stronger security programs," commented Reed Phillips, director of information resources management at the U.S. Department of Commerce. But he suggested that many agencies will ignore the Poindexter memo just as they have ignored U.S. Office of Management and Budget directives on computer security.

"I still see a lot of complacency among other agencies. They're just not interested. Computer security is expensive, and they don't have the people resources to do it," Phillips said.

Government sources said there is no timetable for agency action and no enforcement mechanism.

Security techniques

Poindexter's memo said federal agencies must ensure that communications and information systems handling sensitive information employ security techniques commensurate with the level of risk and magnitude of harm that would result from security breaches.

The policy applies to all agencies in the executive branch of the U.S. government and their contractors.

In essence, the NSDD 145 created a security level below the national security classifications of top secret, secret and confidential. "Sensitive but unclassified information is information the disclosure, loss, misuse, alteration or destruction of which could adversely affect national security or other federal government interests," Poindexter's policy memo stated.

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ISDN passes real-world test

From page 1

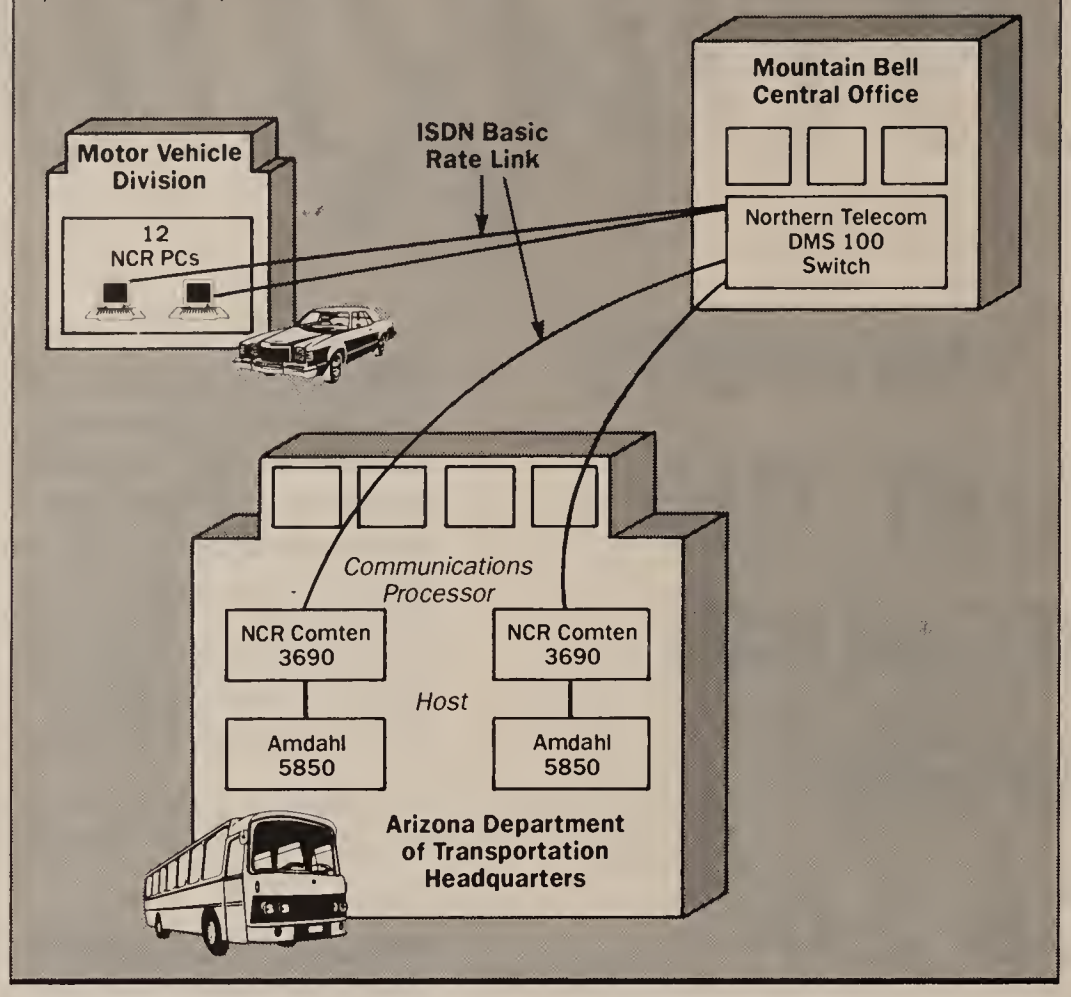
executive officer, placed a five-minute voice call at the Phoenix Civic Plaza to Arizona Secretary of State Rose Mofford and simultaneously transmitted a certificate commemorating the event. The transmissions were handled by Northern Telecom's Meridian digital telephone sets and workstations and passed through a Northern Telecom DMS-100 ISDN switch at Mountain Bell's Phoenix central office.

In the second ISDN application, John Amidon, deputy manager of information systems of operation for the Arizona Department of Transportation, used an NCR Corp. personal computer to access and alter a driver's record residing on an Amdahl Corp. 5850 host in the Motor Vehicles Division building two blocks away (see diagram).

A prototype ISDN interface from NCR enabled the PCs to transmit requests over a basic 64K bit/sec. ISDN line through the Mountain Bell ISDN switch and to NCR Comten, Inc. 3690 front ends for two Amdahl hosts. The 3690s are also equipped with ISDN interfaces that translate the ISDN Basic Rate to RS-232 protocols.

ISDN goes on trial

Arizona Department of Transportation employees access hosts with personal computers



Technology beneficial

A major Mountain Bell customer, the state government of Arizona decided to accept the divested bell operating company's invitation to participate in an ISDN trial "less because of ISDN's future as a standard, which will be a long time coming, than because we thought the technology might benefit us," Amidon said.

Sending both voice and data in digital form over the same twisted-pair telephone wiring "is more reliable than analog communications and in the long run will save us a lot of money," he added. Workstations linked over an ISDN basic interface "can be moved as easily as you can move telephones, as opposed to having to restring coaxial cable," he added.

During the six-month ISDN trial, 12 PCs at the Motor Vehicle Division, which are now hard-wired to the Amdahl hosts via NCR Comten communications controllers, will be replaced by NCR PCs that will access the hosts via a link to Mountain Bell's ISDN switch, Amidon said. The department also plans to install AT&T digital telephones that can use the same ISDN links "since the motor vehicle people often have to deal with the public over the phone," he added.

During the January-February time frame, the department plans to connect IBM Personal Computers at a remote construction site to the Amdahl hosts at headquarters via a dual link: first to Mountain Bell's CCITT X.25 packet-switched network and from there to the divested Bell operating company's ISDN switch over the D channel reserved for data packets.

The advantage here is the ISDN basic interface's ability to transfer data at 64K bit/sec. "Currently we use 1,200 bit/sec. telephone line connections, which are much too slow," Amidon said.

NCR Comten is taking part in the ISDN prototype "so that we can develop hands-on expertise working with users, carriers and other equipment suppliers in the ISDN environment," said company spokeswoman Barry Carmichael.

The company has no immediate plans to develop commercial ISDN interfaces "until user demand, services and terminal equipment are there," said NCR Comten senior systems engineer Richard Schwarz. "The window should open around 1988, after most field trials are concluded," he added.

Third trial

In a third Mountain Bell-sponsored ISDN trial, scheduled to begin in late December or early January, Honeywell, Inc. executives working at home will access their company's host systems through a GTE Corp. GTD5EAX ISDN switch residing at a Mountain Bell central office.

The trials involve the basic ISDN interface, which was designed primarily for workstations and is composed of two 64K bit/sec. B channels to carry voice or data and one 16K bit/sec. D channel for signaling and packet-switched data.

Another trial, sponsored by Ameritech's operating company Illinois Bell, that is scheduled to begin Dec. 16 will involve both the basic and primary ISDN interfaces. The primary interface, which defines 23 B channels and one D channel, is used most often for higher speed applications such as host-to-host and host-to-private branch exchange connections.

The trial will link a variety of data and voice equipment at three McDonald's Corp. sites via an AT&T ISDN 5ESS central office switch in Oak Brook, Ill., an Illinois Bell spokesman said.

Exec promises angry users IBM to improve office systems

By Donna Raimondi

HOUSTON — Confronted with charges that IBM office systems do not work efficiently, company officials promised a range of added functions during a debate at an office systems seminar here last week.

"I have been trying to implement Displaywrite 36 for the office for 15 months now," one user said. "I have a half million dollars' worth of equipment that I have had to put aside."

Tony Mondello, vice-president of software development and office systems with IBM Information Services, said IBM will provide consistent user interfaces across its Personal Computer, System/36 and 38 and 370 architectures, added office functionality and ease of learning and use for users.

Mondello spoke to about 200 vendors, analysts and users at the "Future Strategies in the Office" seminar hosted by Rossi Consultants of Marblehead, Mass., and Houston's Innova office technologies and design center. The seminar gave nine major office vendors a platform for describing future office systems, but user and analyst interest was clearly focused on IBM.

'How many years?'

"I heard your strategy five months ago, but I don't hear anything like that when I call the support hot line," said the user, who later declined to be identified or to expand on her situation. "How many years down the road is it?"

Mondello promised more integration of the Personal Computer with the System/36 and 370 architectures and improved ways to integrate them during 1987. But he indicated that the user might have to wait for correction of an "embarrassing" printer snafu that prevents the user from printing out certain kinds of formats.

"You will have a list of functions that won't be ready in six or 12 months, and I know you won't be happy with that. But PC integration is the first step. We will implement the strategy," Mondello said.

When asked if IBM would close the PC architecture, Mondello said, "Do you really think we would do that? The IBM PC is the industry, and we benefit from not closing it. . . . We created that industry. We are not about to screw it up."

At least one analyst was not convinced. "I believe IBM will close its architecture to new development but allow users to run old applications on future PCs," said Jerry Eisen, president of Office Sciences International.

Users and analysts also questioned IBM officials about the awkwardness of using Distributed Office Support System (Disoss) and the lack of compatibility in its mid-range systems.

Disoss is difficult to understand and is a resource hog that a lot of users do not want on their systems, said Molly Upton, vice-president of applied technologies at International Data Corp. In answer to her plea for a more palatable Disoss implementation, IBM indicated that would happen.

"We have to make it more palatable because it is the backbone for our library distribution services," Mondello said. IBM will give Disoss better performance and more usable functions. "There is no secret technology that will jump up here. Disoss is it. There are problems, and we have to fix them, but Disoss is the base we are going with," he added.

Alternative to Disoss

One company at the seminar attended in hopes of finding an alternative to Disoss. "We have IBM 8100s that IBM dropped. Although we are traditionally an all-IBM shop, we are afraid to implement Disoss because of its difficulty," the office automation manager said.

While IBM is the environment other vendors must be compatible with, users may not need to be IBM compatible, said Rudy Strobl, senior management consultant at Arthur D. Little, Inc. "It is a myth that everything has to talk to everything else in your shop," he said. Users should adopt the attitude that they are the office systems industry's driving force, Strobl said. "The user has to get what he wants or not buy," he added.

In the integration of vertical market applications into office systems, IBM does not even figure at this point, Strobl said. Although Digital Equipment Corp. is clearly ahead and Wang Laboratories, Inc. and Data General Corp. are making good progress, IBM's 9370 makes Big Blue best positioned in the long term because users will have access to the mainframe through the VM operating system and access to PC applications through DOS, he added.

Starlan clears highest hurdle in gaining IEEE approval

Scheme now looms as networking standard

By Jeffry Beeler

SAN DIEGO — Starlan last week passed perhaps its severest test en route to becoming an official industry standard when the networking scheme won unanimous approval from the Institute of Electrical and Electronics Engineers' (IEEE) 802.3 working group.

By a 34-to-zero margin with no abstentions, group members voted to endorse a recently amended draft of the proposed Starlan standard and recommended that the document move another step toward ultimate acceptance.

The proposed IEEE Starlan standard defines an unshielded twisted-pair version of the 802.3 networking protocols that use carrier-sense multiple access with collision detection as a media access method. Supporting data rates of 1M bit/sec., the network is considered a low-cost, lower speed alternative to 10M bit/sec. coaxial cable-based 802.3 networks, which, unlike Starlan, require the installation of special wiring.

Despite the fact that the IEEE still has not given final approval to Starlan specifications, several vendors have already introduced Starlan products. AT&T announced its version of Starlan in March 1985, and Hewlett-Packard Co. announced Starlan support two weeks ago [CW, Nov. 10].

The Nov. 20 vote, which coincided with the group's third and final 1986 plenary meeting, came just two days after the One Base Five working committee approved its latest revisions to the draft Starlan standard.

Of the 55 committee participants who cast ballots, all but five expressed satisfaction with how the body has responded to questions that some of its own members have raised recently about the proposed standard's technical content. Three of the voters abstained, while two others dissented.

Despite scoring twin victories in swift succession, Starlan still must gain the blessing of two additional IEEE-affiliated organizations before it can qualify as an industry standard. The first such entity is the Technical Committee for Computer Communications (TCCC), which is expected to announce its decision in March when the next plenary session will convene in New Orleans.

If the networking scheme gets past the TCCC, it will then go before the IEEE Standards Board, which will probably decide Starlan's fate when it holds its next meeting in June.

Even though the proposed standard still faces at least another six months of continued scrutiny, its passage through both the 802.3 working group and One Base Five constitutes a major step toward final adoption.

"Getting to the working group is the biggest hurdle that Starlan has to overcome on the way to formal approval as a standard," according to Bob Galin, who chairs a key 802.3 task force. "History proves that once a proposed standard emerges from a working group, its chances of acceptance rise to about 99%."

Although the lopsidedness of the IEEE's latest balloting may have been a bit surprising, the working group's endorsement of the Starlan standard was far from unexpected. Most of the group's participants represent vendors that have either already announced Starlan products or expect to do so soon, Galin said. So members were unlikely to reject a networking standard in which their employers have a vested interest.

TOP OF THE NEWS

NEWS from page 1

ested in pieces of Memorex's IBM plug-compatible peripherals business, said Executive Vice-President Roy L. King, but not at the price set by parent company Unisys, formerly Burroughs. "There were some pieces of Memorex that would have been advantageous to Telex. There is a lot of commonality of product, and Memorex's international business — which represents 70% of their revenue — is strong," King said. "Telex was interested, but not at the price."

■

At Comdex/Fall '86, the Federal Communications Commission seized noncertified equipment displayed by the Wholesale Outlet, based in Albany, N.Y. The firm had already been fined $2,000 for offering noncertified devices and had falsely labeled its equipment in an attempt to show compliance with FCC regulations, said U.S. Attorney for the District of Nevada William A. Maddox.

■

Lotus last week began shipping HAL, a $150 English-language interface aimed at simplifying Lotus's 1-2-3. HAL is expected on retailers' shelves this week.

■

Compaq Computer introduced a new version of its Deskpro 286 that uses the same high-speed 40M-byte disk drive as the firm's Deskpro 386.

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Performance, box size stifle PC XT Model 286 demand

By David Bright

Although IBM claims its Personal Computer XT Model 286 system fills a product line gap between the XT and AT models, the system has attracted little interest since its early September introduction.

Managers give clear-cut reasons for having so far shunned the $3,995 system: While less expensive than the AT, the XT Model 286 offers less performance. Furthermore, most boards built for the AT simply will not fit into the XT Model 286's smaller XT-size box.

An office systems manager at a Southern California aerospace company suggests that the XT Model 286 was a blunder on IBM's part. "The turkeys made the guts a different size," he exclaims. "The case is too short. Who needs the aggravation for the few bucks that you save? We've already got the ATs pretty well integrated into our product line, and rather than fiddle around with yet another device, we'll stick with what we have."

A personal computer system manager at another strong IBM shop stresses that price and performance are two separate issues. According to Ed Macke at Northrop Corp.'s Defense Systems Division in Rolling Meadows, Ill., the machine's lower performance is a negative, and the board issue raises too many unanswered questions, such as compatibility with existing ATs and vendor support and supply as well as add-on boards' effect on existing software.

"I can't imagine why anyone would buy [the XT Model 286]," says John McCarthy, research manager at Forrester Research, Inc. in Cambridge, Mass. "It was too little, too late — one of the fluff announcements of the year."

The XT Model 286 comes with a 6-MHz Intel Corp. 80286 zero-wait state processor, a 20M-byte hard disk drive with an 85-msec average access time and a 157W power supply. In comparison, the $5,295 AT includes an 8-MHz, one-wait state 80286, a 40-msec 30M-byte drive and a 192W power supply.

At a recent meeting, the Chicago Association of Microcomputer Professionals discussed the XT Model 286. Little interest was shown, says director Julian Horwich, and most members indicated that they would stick with ATs or equivalent machines. At his company — a large pharmaceuticals firm — Horwich says the XT Model 286's lower price is not enough to make up for the accompanying performance trade-offs of sacrificing disk speed and possibly encountering board problems.

A Computerland Corp. spokesman agrees that the XT Model 286 is not selling up to IBM's expectations. According to an IBM spokesman, however, Big Blue is "pleased with the reception that customers have given the XT 286."

In case the XT 286 or a succeeding Intel 80286-based machine with the same form factor does start to sell, vendors of add-in boards have begun making boards that fit both the XT 286 and the AT. Two such vendors are Ideassociates, Inc. and AST Research, Inc., which both recently offered multifunction cards.

Tony Paradiso, multifunction products marketing director at AST, says that AST plans to eventually shrink all of its AT boards to the XT Model 286 form factor. The reason is to "insure ourselves" in case IBM comes out with another 80286-based machine using the XT Model 286's form factor, he adds.

IBM stirs stew with prototypes

From page 1

would lose a controlling position in the 386 market, as users enamored with the current 386 offerings from Compaq and others buy in larger volumes.

Competing vendors have been hoping to establish a de facto standard for 80386 machines prior to an IBM introduction, but the appearance of IBM prototypes could hinder those efforts.

Users, vendors and analysts claim that IBM has established nondisclosure relationships with a select group of end-user sites and key microcomputer software developers in order to show early prototypes of an Intel 80386-based machine.

IBM is showing the machines even though it has still not determined their ultimate configuration, sources say.

They indicate that IBM is still grappling with the issue of a possible custom 80386 processor and with the decision to offer a proprietary operating system. Another issue involves the complexity of networking between the IBM machine and the firm's larger systems, sources say.

Some sources, such as the head of an influential group of personal computer users, say that IBM is distributing several "early alpha" prototypes of an 80386-based machine to a highly select group of beta testers, including large software and networking vendors, as well as a small handful of large end-user sites.

That source says a January announcement of such a machine is possible, although most industry sources and analysts are predicting a mid-year announcement, with one lone analyst contacted calling for a 1988 announcement.

Another source refers to the machines as simply experimental.

'Five or six prototypes'

Sources caution that the final version could differ radically from prototypes. "There are several, maybe five or six, prototypes, and IBM is making a number of changes to these machines," says George F. Colony, president of Forrester Research, Inc., a Cambridge, Mass.-based consulting firm.

Colony says some users have been briefed by IBM officials about the machine.

"There is more than one prototype out. Everybody is focusing on the 386 prototype, but IBM still has a proprietary system that is being shown around, at least internally at IBM," says Clare Fleig, an analyst with Los Altos, Calif.-based International Technology Group, a research and consulting firm.

She adds that the proprietary system is based on an IBM 370 architecture chip and that IBM is also working on a System/36 microprocessor.

"There is no guarantee that because people are seeing this machine that this will be the final form it will be in when it's announced. They could use the 386 as a secondary processor for specific functions and use another one as the central CPU and still have compatibility with existing software," Fleig says.

"It is a perfect time for IBM to make a break. All of these people like the Tandys and the Televideos continue to say, 'We are compatible,' but you can't be compatible with something that doesn't exist," Fleig says.

Despite the lack of a final configuration, an early look at prototype machines is a great help for vendors writing software to run on the new machine, one user says.

He adds that a variety of prototypes does not create problems as long as items such as memory size, number of slots and storage devices remain essentially the same.

IBM machine on the way

Other sources say an IBM 386 machine may be a long way off but, nonetheless, is on the way. "I've got to believe there are three or four groups at IBM doing 386-based machines, and I wouldn't be surprised if they don't even know which one to release and when," says Ed Belove, vice-president of research and development for Lotus Development Corp.

"IBM isn't going to ship until they have a good history of production on that chip. IBM, rightly so, is very conservative about single-sourced chips of that complexity. And right now, what happens if the Intel 386 line has a glitch in it? That happens in the semiconductor business.

"I think they're going to want to see some reasonable time period of flow and probably a second source — whether it's internally second-sourced or externally," Belove says.

Other factors may hold back an IBM move into 386 territory. "There's two things that are going to hold them up. One, why do they need it? There's no compelling reason for them to announce a 386 unless they have something really unique and exciting.

"And until there's the next-generation operating system. Those two go hand in hand. I would assume IBM wants to ship them together," Belove says.

Computerworld *senior writers David Bright and Eddy Goldberg contributed to this report.*

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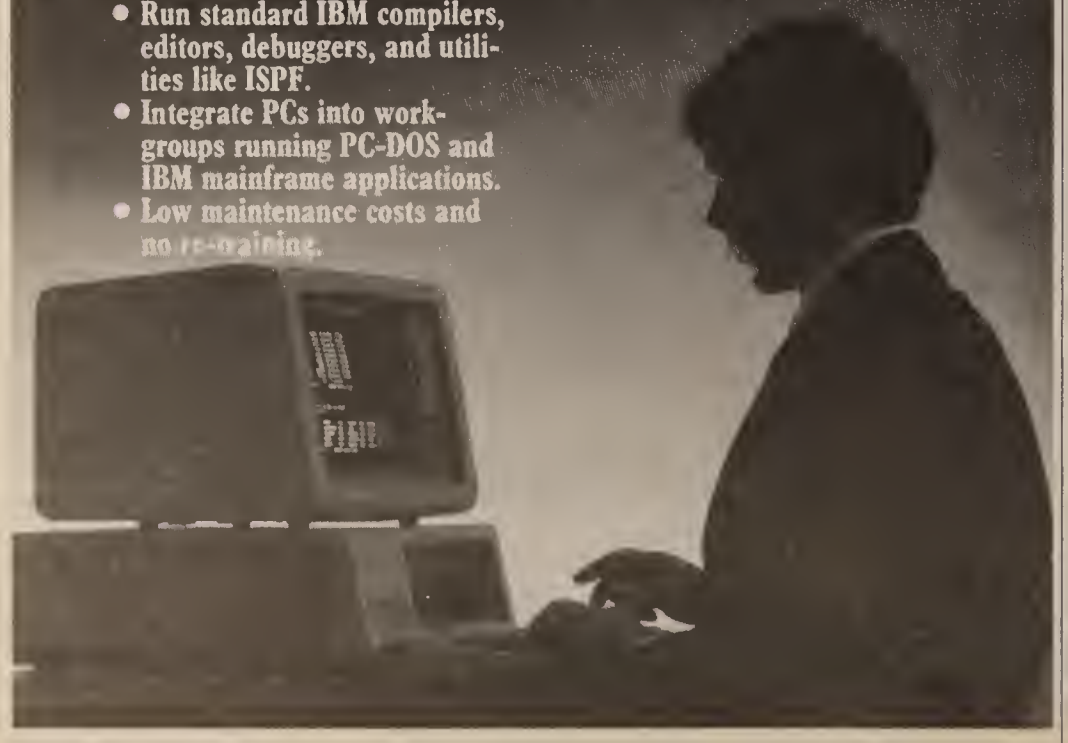

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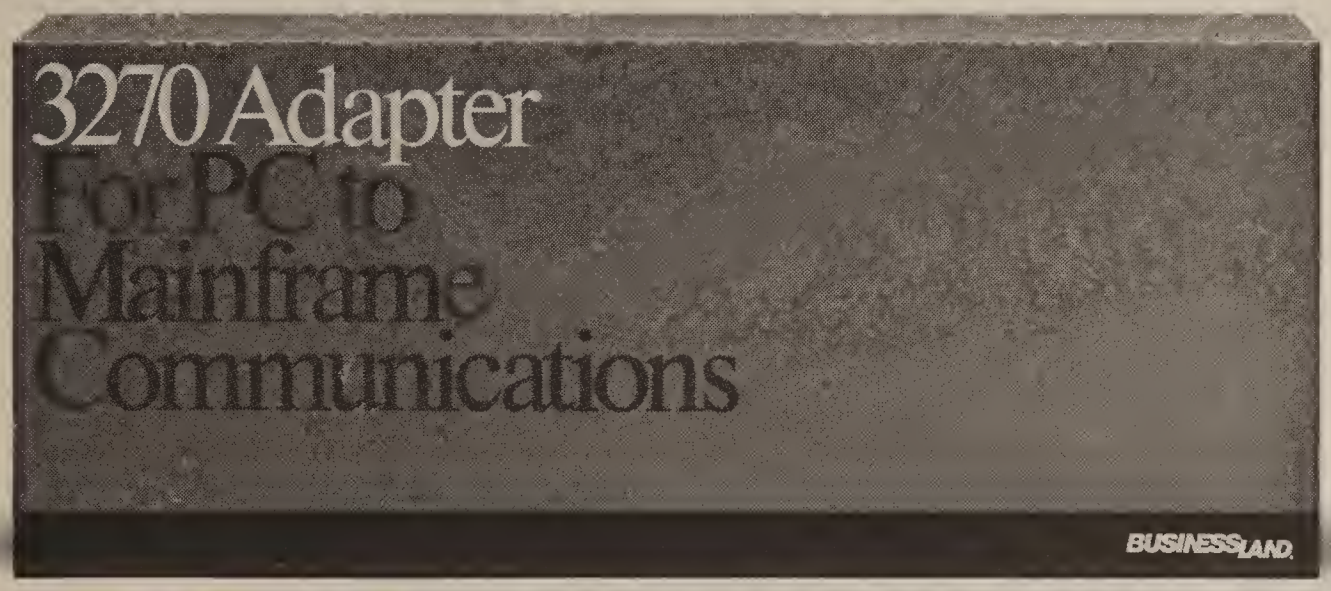

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IBM Corporate Service Amendment clients still waiting

MIS enthusiastic but needs details

By Jean S. Bozman

Some major IBM customers eagerly anticipating signing up for the company's Corporate Service Amendment (CSA) maintenance option, announced in early October, are still waiting for detailed IBM presentations on the subject.

The CSA option takes effect Jan. 1, but customers who previously participated in IBM's Enterprise Maintenance Agreement test program have until Oct. 31, 1987, to qualify for CSA.

Some Fortune 500 MIS managers contacted last week said they are anticipating savings of up to 16% on maintenance of their IBM mainframes but have yet to meet with IBM sales teams to go over specific numbers.

'Worth looking into'

"I'm still waiting for a briefing from my marketing team," said an MIS director at a large California bank. "But I am very interested in learning more about it. Anything that would save us money on maintenance is worth looking into."

The MIS executive at a large oil company in Texas, who attended a satellite-network briefing by IBM on Oct. 7, at which CSA was presented in a 10- to 15-minute summary, last week said he was looking forward to getting involved in the program.

However, he had not yet received a detailed briefing specific to his company either. "We anticipate that we will take advantage of that offering," he claimed, "but I still haven't seen a set of numbers that show how much we'll save."

Many customers have had to rely on customer-relations letters that spell out the conditions of CSA. These letters reveal a number of general requirements:

- Customers who choose the Network Option to cover maintenance charges on networking devices must install IBM's Electronic Customer Communications Option (ECCO). ECCO is a link between an IBM Personal Computer at the customer's Help desk and IBM's maintenance organization.

"Using a customer-supplied personal computer with dial-up capabilities, the Help desk will be able to request IBM service and to receive status updates on active IBM service calls," the IBM customer letter said.

- All sites to be covered by CSA must be assessed by IBM, but IBM will waive the $3,500 systems assessment fee if the customer is also requesting a network assessment, which is priced at $8,600.

In addition, if IBM finds that the site fails the networking assessment, it will return $5,100 of the fee to the customer.

Maintenance procedures

For the systems option, IBM is only requiring that certain maintenance procedures be adopted by the user, aiding in problem determination. However, for network maintenance, IBM is requiring a good deal more.

Customers who want IBM network maintenance are required to set up a centralized control center, which must document all problem-determination activity before IBM is called in. Everything on the network must be clearly defined, IBM's customer letter said.

"A current configuration diagram including, but not limited to, every point-to-point connection and specific identification of each network resource is required," IBM declared. Many large customers already have such control centers in place, but for others these requirements may mean costly additions to their telecommunications facilities.

In the end, IBM reserves the right to periodically reassess any customer site to see if it is still operating up to IBM's CSA specifications.

If it is not, IBM will notify users in writing, and they will have 90 days to correct the problem.

"Failure to do so," IBM said, "will result in the termination of this amendment."

Bozman is a Computerworld *contributor based in Chicago.*

IBM's Corporate Service Amendments

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3276	10	20	40
3278	5	15	15
3279	5	15	25
3705	15	25	310
3725	10	20	350
5251	5	15	40
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8809	10	20	100
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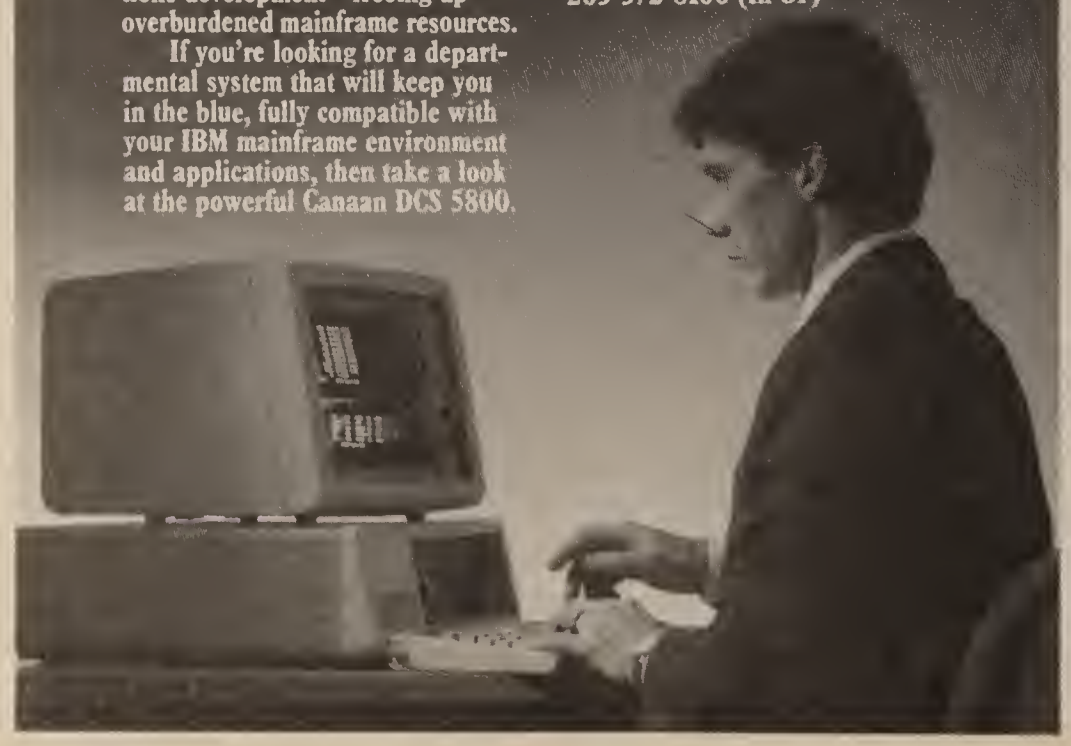

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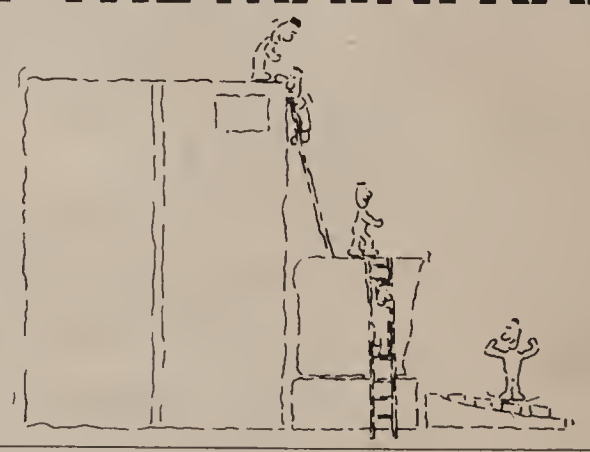

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IBM Personal Computers

HP launches speedier models of 3000 to shore up low end

Boasts jazzed up memory, cache

By Jeffry Beeler

CUPERTINO, Calif. — Hewlett-Packard Co. last week retired the three smallest members of its 3000 business systems family and replaced them with two 16-bit models that reportedly offer 30% to 50% better price/performance than the earlier machines.

Optimized for I/O-intensive applications in work groups, according to company spokesmen, the Micro 3000 and Micro 3000XE mark the first time HP has implemented 1M-bit memory chips and NMOS III logic in any of its commercial processors. NMOS III, a microprocessor technology proprietary to HP, first appeared in the vendor's 9000 series of technical and engineering workstations.

The Micro 3000 and 3000XE are also the first of HP's low-end departmental systems to support disk caching, an I/O-enhancing technique in which frequently used data resides in main memory to minimize access times. Disk caching was formerly restricted to the 3000 line's mid-range and high-end processors, according to Doug Spreng, general manager of HP's Computer Systems Division.

Because the Micro 3000 will be used chiefly by computing novices, the machine will be bundled with Easy Time, a previously unavailable shell that reportedly uses menus to simplify system operations such as printing and backup.

User shares enthusiasm

HP's enthusiasm for its low-end 3000 additions was shared by an early user and other outside observers. During the two months that Long's Drug Stores, Inc. has served as a beta-test site for the 3000XE, the company's experiences have corroborated HP's product performance claims. "We've gotten about 40% more throughput with the new machine than with the HP unit it replaced," said William Gates, the Walnut Creek, Calif.-based firm's DP manager.

For Long's, higher performance has translated into improved response times, "which are important because we put systems in our stores to provide customer service," Gates said. "The faster we can service our customers, the better off we are."

Alexia Martin, associate editor with the Seybold Office Computing Group, said the chief attraction of the Micro 3000 and 3000XE is that they combine big-systems capabilities with small-systems ease of use. Access to Easy Time makes "management of the systems simple for non-technical operators," Martin said. "But at the same time, the processors also provide advanced office services like file sharing and electronic mail and run the same HP Turbo Image data base software as larger 3000 systems."

The Micro 3000 and 3000XE lend credence to the view that HP's departmental processor family is alive and well, said Dataquest, Inc. President Gwen Peterson. "The rest of the industry tends to write the product line off. But HP doesn't, and neither do its customers."

Although the Micro 3000 and 3000XE use the same 9-MHz NMOS III microprocessors and are identical in their integrated packaging, the two machines differ substantially from each other. The Micro 3000, which replaces HP's existing Models 37 and 37XE, supports up to 16 users and is intended primarily for small businesses. By contrast, the Micro 3000XE replaces the existing Model 42, supports as many as 56 users and is geared to serve either as a departmental processor or as a host in the branch offices of major corporations.

Compared with the Model 37, the Micro 3000 provides 35% more system throughput for a 21% lower price, and the Micro XE equals the performance of the Model 42 but costs 30% less.

Increased throughput is partly due to use of disk caching and the ability to support HP's latest line of disk systems, which perform 20% to 50% more I/O operations per second than earlier models, Spreng said.

Users of installed Model 37s or 37XEs can upgrade in the field to a Micro 3000XE by switching boards. Expansion from a Micro 3000 to a 3000XE, however, requires a wholesale swap of boxes. A similar exchange of boxes is also required to upgrade from the Micro 3000XE to the next largest system in the 3000 line, the Model 52. But because all HP departmental processors use the same system software, users can migrate from a Micro 3000 or 3000XE to any other family member without converting their existing applications, according to Computer Systems Division marketing manager Bill Walker.

A basic 2M-byte Micro 3000 with an 81M-byte drive costs $25,730 and expands to accommodate up to 4M bytes of main memory and 2.2G bytes of disk capacity. A minimum 3000XE also starts with 2M bytes but, with an entry-level price of $57,500, incorporates a 130M-byte drive and holds up to 8M bytes of main memory and 4.5G bytes of disk.

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Proteon unveils token-ring products for IBM, DEC units

Offers enhancements for T1, Decnet support

By Peggy Watt

SAN FRANCISCO — Proteon, Inc. last week unveiled products that link IBM Personal Computer ATs and Sun Microsystems, Inc. AT-compatible workstations into its Pronet-10 and Pronet-80 token-ring local-area networks (LAN).

The company also announced enhancements that allow its gateway product to support Digital Equipment Corp.'s Decnet and T1 1.5M bit/sec. connections. Additionally, Proteon unveiled at the Localnet show here a network interface system designed to do the job of an IBM 3274 cluster controller.

The Sun VMEbus Interface System provides for the first time a token-ring connection for Sun workstations, according to Patrick Lally, Proteon vice-president of sales and marketing. Interfaces to Proteon's 10M bit/sec. Pronet-10 and 80M bit/sec. Pronet-80 support the fastest data transfer speeds available for computer-aided engineering applications such as image transfer as well as network file access, he added.

The board-level interfaces include an optional optical-fiber link for applications that require greater resistance to electrical interference, Proteon said. The Interface System supports Sun's Network File System, its version of Transmission Control Protocol/Internet Protocol (TCP/IP) networking protocols.

The basic Sun VMEbus Interface for Pronet-10 costs $2,700. Boards with built-in fiber-optic connections are also available, priced at $3,800 for single fiber, $4,100 for dual-redundant fiber and $4,350 for counter-rotating fiber. All are available now. The Pronet-80 board costs $6,900; with on-board fiber connectors, its price is $9,100 for single fiber, $10,000 for dual fiber and $10,400 for counter-rotating fiber.

Proteon's new P1303 board plugs into high-speed IBM PC AT-class machines, allowing access to the 10M bit/sec. Pronet-10 token-ring LAN, even for compatibles that run at 10 MHz, 12 MHz or 16MHz, according to Tony Bolton, Proteon marketing director.

The board also works with Compaq Computer Corp.'s new Intel Corp. 80386-based Compaq 386 Deskpro and PC's Ltd.'s 16-MHz PC AT clone. The P1303 board is priced at $899 and is scheduled to be available in January.

User-configured protocols

Proteon also annnounced enhancements to the existing Proteon Gateway, which links Pronet-10 and -80 token-ring LANs to other types of networks. The enhancements allow the gateway to be user-configured for different combinations of protocols. In addition to supporting network-layer industry standard protocols such as TCP/IP and XNS, the gateway now supports Decnet.

A T1 connection allows the Proteon Gateway to pass on transmissions complying to the above protocols across a wide-area 1.5M bit/sec. link. Current customers can upgrade their Pronet system software for approximately $895, said Michael Katz, Proteon product manager for gateway products.

The new gateways are being installed at the Institute of Defense Analysis in Alexandria, Va., where a software development team working on 18 Sun workstations and a network file server in two office buildings will communicate over T1 lines. An Ethernet link connects DEC VAXs running Unix, said Neal Schofield, computer services manager at the institute. While the system does not yet use Decnet, Proteon's gateway will make that an attractive option in the future, he added.

"What drove the decision was finding Proteon and Sun have worked together before, and the equipment seems to meet the needs," Schofield said.

"We have a lot of small work groups of four or five people, so the office lends itself well to small networks. The Proteon network gives us the flexibility to move workstations and people around as the work is done," he added.

Proteon's Katz said the T1 support is aimed at customers with geographically separated offices. "We've been getting lots of requests from our existing customer base, including Arpanet users, academic institutions and DEC users," Schofield said.

Government agencies find the data flow controls attractive, because they enable the system manager to provide selective access and secure sections of the network, he added.

The Pronet 3270 Network Interface System is intended to replace an IBM 3274 cluster controller as an interface between a Pronet-10 or Pronet-80 LAN and an IBM host, Proteon said. The system connects directly to an IBM host bus and tag channel and supports up to 48 physical devices — 16 more devices than an IBM 3174 or 3274 cluster controller supports, Proteon claimed.

The Interface System is priced at $33,200 and will be available in January. The Pronet-10 connection is available now, and the Pronet-80 link will be out in January, the firm said.

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AT&T seeks to lower net rate

Also proposes increase in private line charges

By Elisabeth Horwitt

WASHINGTON, D.C. — AT&T last week submitted to the Federal Communications Commission rate changes that it claimed would reduce interstate long-distance prices by $1.2 billion overall.

But a 3.3% increase in private-line charges that AT&T included in its proposal is likely to encounter active resistance from business customers, one user advocate group said.

With the proposed reductions, slated to take effect Jan. 1, AT&T is passing along cost savings that it will realize from lowered local access charges, which will mean an 8.1% overall reduction to the long-distance service for millions of business and residential customers, the firm said.

AT&T's suggested tariff changes, however, could mean substantial rate increases to business users that rely heavily on private-line connections, said Brian Moir, a partner at Fisher, Wayland, Cooper, Leader and counsel for the national user organization International Communications Association. While "AT&T has successfully painted a picture of overall rate cuts to the world, we feel that a 3.3% across-the-board increase to nonswitched private-line services is ridiculous," he said.

Rate changes to AT&T's business (switched) services proposed last week include the following:

- An 11.6% reduction for state-to-state AT&T long-distance service calls during the day.
- A 16.7% reduction of monthly charges for Megacom and Megacom 800 services and usage charge reductions of 4% for Megacom and 1.4% for Megacom 800.
- An aggregate 4.2% reduction of usage charges for Software Defined Network services that involve private-line access.
- A reduction averaging 2.3% for AT&T WATS and 800 services, with some users experiencing a rate increase and introduction of a new monthly service charge for both services.

MCI Communications Corp. and U.S. Sprint Communications Corp. reportedly will lower their prices in response to AT&T's reductions. "It's always been our policy to be lower than AT&T," said U.S. Sprint spokesman Sydney Courson. "If that requires a rate adjustment by January 1, we'll do it."

AT&T also proposed across-the-board 3.3% increases for monthly recurring and nonrecurring charges for special services. Affected services include private analog and digital lines, the Accunet family of digital services, including Dataphone Digital Service, Alliance Dedicated Service and some Skynet satellite services. The 3.3% increase also applies to minutes-of-use charges associated with Accunet Switched 56 Service and Accunet Reserved 1.5 Service.

AT&T's proposed increases do not apply to customers of Accunet Packet Service and Skynet Star Network Service, which are subject to special accounting orders, or to Accunet T1.5 Service, for which pricing changes have already been approved by the FCC. That tariff, scheduled to take effect Dec. 8, reduces by 26% usage charges for distances of more than 100 miles and increases by 26% usage charges for circuits extending fewer than 100 miles. The change is part of AT&T's overall strategy to have pricing more closely reflect circuit cost and to stop having long-haul business subsidize short-haul business, Byrnes said.

AT&T is making the increases because "historically, we've earned far less than the authorized rate of return" on the above special services, said AT&T spokesman Jim Byrnes.

Moir took issue with Byrnes's explanation. "For three years now, I've heard AT&T make the claim that its dedicated services were not earning the authorized rate of return as a way to rationalize all kinds of rate increases," he said.

In a separate FCC filing, AT&T proposed a new 2.4K bit/sec. access option to its Accunet Packet Service. The proposal is scheduled to start Dec. 29 and is AT&T's attempt to boost demand for the packet service, "which needs all the help it can get," Byrnes said.

Users and vendors blast FCC protocol conversion proposal

By Mitch Betts

WASHINGTON, D.C. — Value-added network vendors and communications users last week lambasted a federal proposal to regulate protocol conversion services, arguing that it may force vendors out of business.

The controversy surrounds the Federal Communications Commission's proposal to allow AT&T and the divested Bell operating companies to offer protocol conversion — now an unregulated, enhanced service — as a regulated, basic service. An FCC decision on the matter is expected in January.

AT&T and the Bell operating companies argued in their filings to the FCC that protocol processing is a natural adjunct to basic service and that it would be more efficient to embed protocol conversion in regulated services such as packet switching.

But competitors said the proposal could hand the dominant carriers a monopoly over protocol conversion. "It could easily put us out of business," said Paolo Guidi, president of Telenet Communications Corp., a network vendor in Reston, Va.

The proposal also would subject firms such as Telenet to common-carrier regulation at the federal and state levels, contrary to the FCC's recent push for deregulation, Guidi stated at a press briefing.

If the FCC reclassifies protocol conversion as a basic service, then the dominant carriers could easily combine protocol conversion with regular network service without having to implement the competitive safeguards required for enhanced services under the Third Computer Inquiry regulations, according to filings submitted to the FCC.

Spokesmen for the International Communications Association and the Ad Hoc Telecommunications Users Group said this scenario would reduce competition and deprive users of a diversity of suppliers.

G. Clark Woodford, vice-president for telecommunications services at Compuserve, Inc. in Columbus, Ohio, said the regulatory burdens and carrier-access charges for dial-up lines — about 12 times higher than the line charges it now pays — would probably force Compuserve out of the value-added network business. Compuserve has 215 large clients, including contracts with Visa and American Express Co. for credit card authorization transactions, he said.

"Regulation is deadly to these companies," said Warner Sinback, manager of telecommunications affairs for General Electric Information Services Co. in Rockville, Md., and a spokesman for ADAPSO, a computer services industry association.

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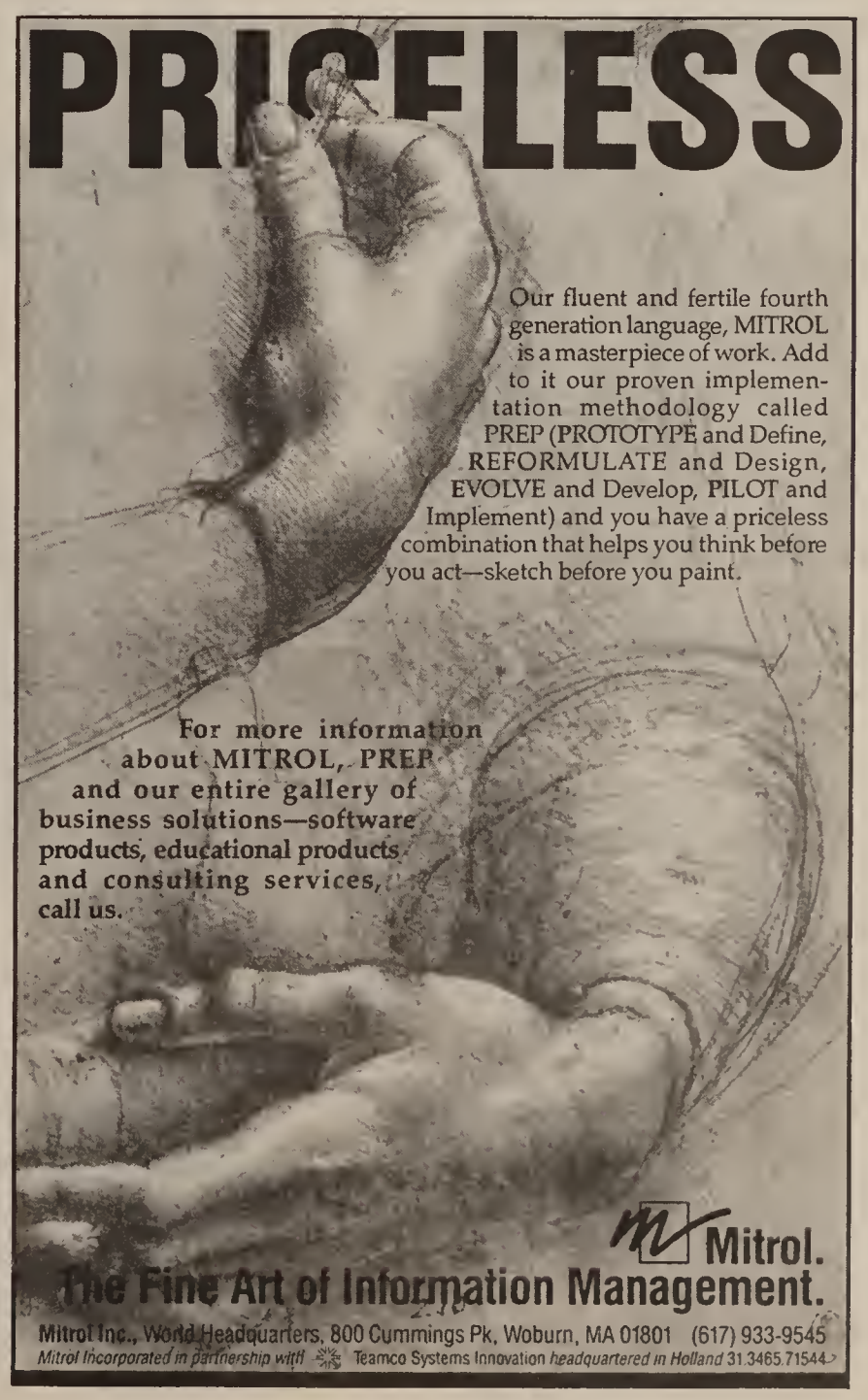

Telex targets System/36, 38-compatible peripherals mart

Hopes to cash in on 370 overlap in IBM shops

By Alan Alper

NEW YORK — Diversifying its mainstay IBM 3270-compatible peripherals line, Telex Computer Products, Inc. last week unveiled a family of terminals and printers that operate within IBM System/36 and 38 environments.

The Tulsa, Okla.-based firm said its decision to enter the compatible peripherals market centers around the coexistence within many IBM shops of System/36 and 38 computers and those that use the 370 architecture.

"We expect that there is about a 40% market overlap between the two," noted R. Frank Jerd, Telex vice-president of sales. "We are the No. 1 supplier of IBM 3270-compatible peripherals and thought we'd broaden our efforts . . . since we're calling on the same people."

In entering the System/36 and 38-compatible market, Telex will be faced with the unenviable task of competing in a business totally dominated by IBM. Unlike the 3270-compatible arena, in which Telex has about 15% of the business, a thriving IBM systems'-compatible business has never developed, analysts said, due to the relatively small size of the market.

Approximately 310,000 System/36 and 38-compatible terminals were shipped domestically in 1985, according to market research firm International Data Corp. (IDC) in Framingham, Mass. IBM controlled 88% of the market, with Decsion Data Corp. and Memorex Corp. accounting for 9% and 3% of the business, respectively.

IDC said it anticipates domestic shipments will grow by between 8% and 10% this year, representing about 340,000 to 350,000 terminals. The firm projects a flat shipment rate for 1987.

Telex said it expected to grab about 15% of the System/36 and 38 peripherals market within the next three years.

Departmental processing grows

"The remote or departmental processing concept continues to grow among the Fortune 1,000 companies," noted Roy L. King, Telex executive vice-president of field operations. "There are over 100,000 System/36 minicomputers installed now, worldwide. And the installation base for the System/38 is also growing. That's why Telex has decided to enter this market."

Telex should be successful in obtaining a market share based on its reputation in the 3270-compatible market, noted Ilene Goldman, an analyst with IDC. The mitigating factor, she said, is the impact of IBM's recently announced 9370 departmental computer family, which extends the 370 architecture into the high-end of the System/36 and 38's mid-range.

"They have a signigicant name in the business," Goldman said, although she expressed concern over the future of the System/36 and 38 business.

Telex introduced four terminals, including the first low-cost 12-in. displays to be marketed to users of the three IBM systems, and four printers, including a low-end laser printer. The firm also announced an IBM 5251 emulation suport feature for its Telex 1200 series of intelligent workstations, which enables users to switch between local processing and System/36 and 38 sessions by pressing a hot key. All the products will be available from the company 90 days after receipt of order. Telex is also evaluating alternate channels of distribution, Jerd noted.

Telex Model 078-2 is 12-in. terminal displaying 1,920 characters on a tilt and swivel monitor. Priced at $1,295, the terminal's display comes in either green or amber.

The Model 079-2 is a 12-in., seven-color terminal that also displays 1,920 characters on a tilt and swivel monitor. Claimed to be the only low-cost IBM 3179-2-compatible terminal on the market, the unit lists for $1,895.

The 180-2 is monochrome 15-in. terminal that displays either 1,920 or 3,564 characters and is plug-compatible with the IBM 3180-2. It is priced at $1,995.

A 14-in., seven-color terminal, Telex's Model 179-2, displays up to 1,920 characters. Plug-compatible with the 3179-2, it lists for $2,095.

All of the Telex terminals have a 122-key adjustable keyboard with up to 1,500 keystrokes of record/playback, the firm said.

The new printers include the Model 201, a dot matrix printer priced at $545, which operates at up to 220 char./sec. and features a single sheet autoloader; the 851, an ink-jet printer that lists for $775 and runs at speeds up to 220 char./sec.; the 214XP, a high-end multifunctional dot matrix printer priced at $5,100, which operates at speeds up to 400 char./sec.; and the 225, a line matrix printer operating at up to 800 lines per minute.

Single unit price for the 5251 emulation feature is $849, the company noted. Volume discounts of up to 24% are offered on the whole product family, Telex said.

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WASHINGTON UPDATE
Mitch Betts

GSA spells out details to FTS 2000 net procurement

The U.S. General Services Administration (GSA) recently spelled out more details of its proposed Federal Telecommunications System (FTS) 2000 intercity digital network, including a price structure intended to keep pressure on the winning vendor.

Critics have said there will be little incentive for the winning vendor to keep its prices low once it wins the $4.5 billion, 10-year contract for FTS 2000. But in GSA's second draft request for proposal (RFP), the agency said the prime contractor must adhere to fixed prices for each of the 10 years of the contract, with only two exceptions: The contractor may lower prices at any time, and price adjustments will be made in the fourth and seventh years if market conditions warrant.

Furthermore, GSA said a monetary award will be granted for every percentage point the FTS 2000 price decreases after the fourth year.

A final RFP is expected Dec. 31, so the contract can be awarded in 1987. Bidders are expected to include AT&T, Martin Marietta Corp. (teamed with MCI Communications Corp.), Boeing Computer Services Co. and U.S. Sprint Communications Co.

Researchers at International Data Corp.'s Washington Division, based in McLean, Va., recently reported that GSA is likely to favor a software-defined network architecture, available from AT&T and MCI.

CBEMA disputes study forecasting trade deficit

The Computer and Business Equipment Manufacturers Association (CBEMA) said a new congressional report that predicts a high-technology trade deficit for 1986 incorrectly suggests the U.S. computer industry is in trouble.

CBEMA President Vico E. Henriques predicted the U.S. will end the year with a $5.3 billion surplus in its computer trade balance. "We do not normally release predictions about our trade balance," Henriques said. "However, we feel it is necessary to correct an impression left by the new Joint Economic Committee study that our industry is in trouble."

Henriques said the congressional report lumps together computers, aircraft, instruments, specialty chemicals and several other commodity items and concludes the aggregate will have a trade deficit. He said CBEMA is concerned the conclusion will encourage Congress to support protectionist legislation.

Henriques acknowledged that the U.S. computer trade surplus has dropped during the past few years but said trade balances are not particularly accurate indicators of the industry's health, since many computer firms are multinational.

OMB revises statistics to reflect industry shift

The U.S. Office of Management and Budget recently announced final revisions to the government's method of reporting industry statistics in order to reflect changes in the computer industry.

The revisions, effective Jan. 1, affect the ubiquitous Standard Industrial Classification (SIC) system, the four-digit SIC codes used in government statistical reports to identify distinct industry categories. The codes have not been updated since 1977, and consequently they lump many computer industry segments under broad categories, masking industry trends [CW, March 3].

The revisions are expected to improve industry research and provide higher visibility for industry segments such as electronic information retrieval services, a category that was grouped with computer facilities management services under the broad category of data processing services.

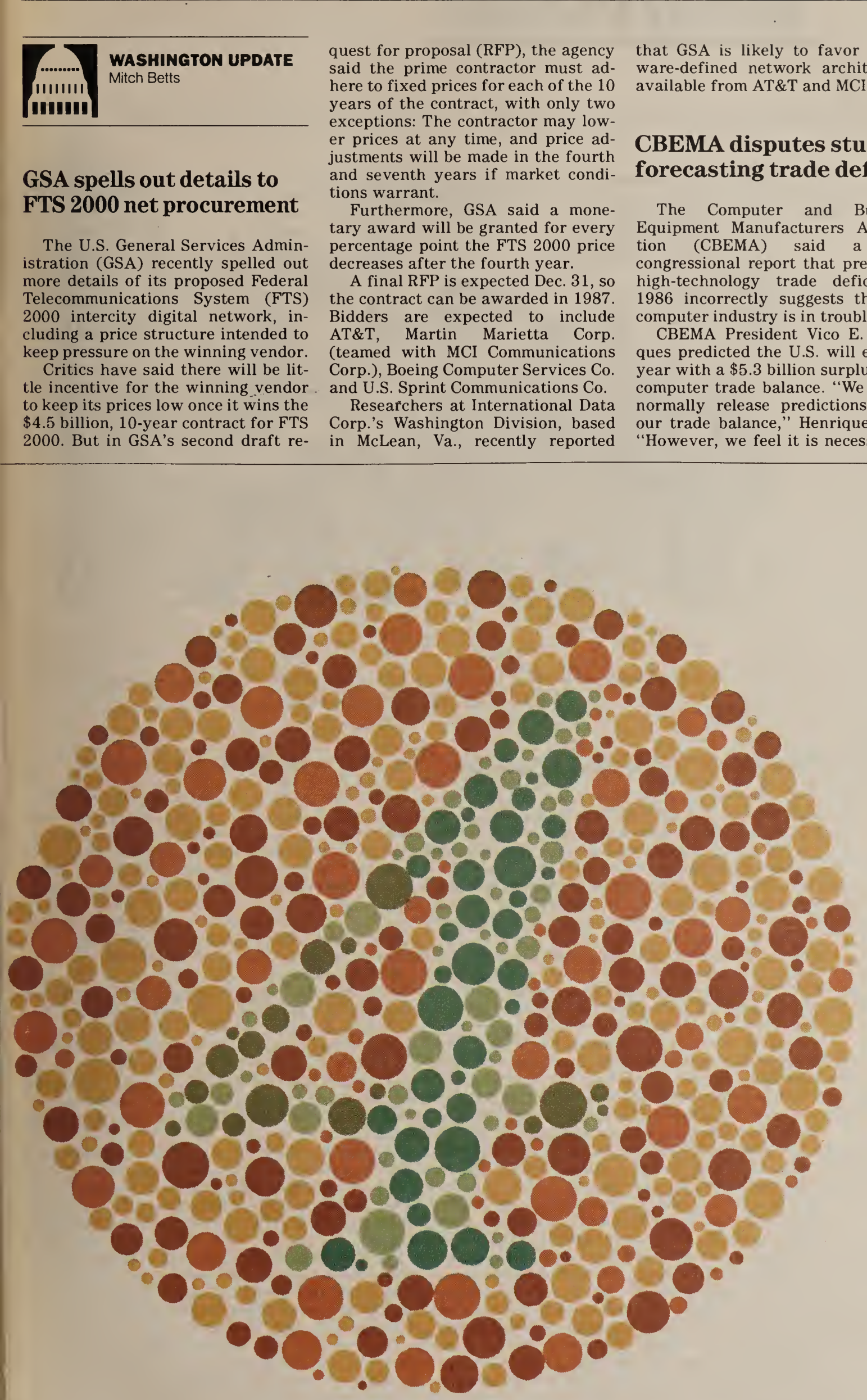
The revised SIC system creates separate codes for each of the following computer industry segments: custom programming services, prepackaged software, electronic information retrieval services, computer rental and leasing, computer maintenance and repair, and computer and software retail stores. Also, the broad category of computer manufacturing will be broken down into separate codes for computers, storage devices and other peripherals.

Federal systems market could reach $4B by '91

The federal systems integration market will continue to show strong growth, topping $4 billion in 1991, according to Input, a research firm with a Rockville, Md., office that studies the federal market.

"Wary of cost overruns and late delivery, federal agencies are sharing implementation risks with vendors," the firm reported. The forecast said the market will grow, at an average annual rate of 15%, from $2 billion in 1986 to $4.1 billion in 1991.

Future government contracts are expected to include scientific and engineering turnkey systems, records management, medical systems, publishing and computer-assisted education systems, Input said. Some of the projects include the Federal Aviation Administration's new air traffic control system and the Internal Revenue Service's tax system redesign.



VIEWPOINT

EDITORIAL

For our eyes only

It sounds all too much like the plot of a James Bond movie: Soviet bloc operatives covertly purchasing IBM 3090s and disemboweling them to discover their computing secrets. Russian students-cum-spies in every European capital combing through commercial electronic data bases for tidbits of scientific, technical and economic data that would give the Soviets an edge in, say, developing fiber-optic technology or even in negotiating a wheat contract.

Such are the scenarios painted by the Reagan administration in its continuing campaign to deny our "enemies" access to technology, both products and research and development data, as well as to assorted other categories of information — agricultural, economic, scientific — that might in any way endanger our national health or security.

The campaign began two years ago, when President Reagan issued National Security Directive 145. Its aim is to ensure the security of computer systems that process classified and so-called sensitive-but-not-classified information, as well as to provide security assistance to the private sector. Charged with realizing these goals is a 22-member National Telecommunications and Information Systems Security Committee, which is headed by an assistant secretary of defense and the director of the National Security Agency.

This week and last saw the latest, and most chilling, steps in the Reagan effort. At last week's annual conference of the Information Industry Association, the trade group representing vendors of information services, a Department of Defense official declared, for the first time, that the federal government was sure to place controls on commercial on-line data bases in order to protect national security. It was, she said, only a question of when and how. Particularly troublesome to the Defense Department is that in the process of gathering and processing unclassified data, data base suppliers create combinations of information that may be sensitive.

Now comes this week's news reports regarding a memo from the president's national security advisor that instructs all federal agencies to identify and protect with stringent computer security measures sensitive information held in government computers.

The spy-movie language and generally unsupported data used by the Defense Department in its description of this "massive, well-organized campaign to acquire Western technology," which yields Moscow "many tens of thousands of documents," may make it tempting to dismiss administration concerns as unnecessary and alarmist.

What is needed instead from all those in the technology community is a recognition of the seriousness of the problem — the need to work out an appropriate balance between the right to free access of information and the legitimate requirements of national security — and an active lobbying through professional and industry groups for an appropriate forum in which to debate that balance. The issue is too critical, too comprehensive and too basic to the both the nation and to the practice of technology to leave it in the hands of those within the defense establishment.

LETTERS TO THE EDITOR

Privacy and information handling

The federal government requires banks to file reports on an individual's transactions that exceed $10,000 per day. Recent actions to reduce this limit to $3,000 per day constitute one of many indicators of a fundamental trend. Allowing data originally given to one government agency for one purpose to be used for another purpose (euphemistically called "computer matching") is another example.

Clearly the government is expanding the types of data it keeps about people as well as the uses of such data. Preventing drug abuse, locating parents not paying child support, apprehending criminals and other laudable objectives are offered as reasons such new types of data should be gathered and why previously gathered data should be used differently. Although there is much talk about why these things should be done ["A call for consensus," CW, Oct. 27], there is little discussion of the long-term repercussions. Compared with Europeans, Americans seem unconcerned about the privacy and liberty issues that such actions should naturally cause us to consider.

Meanwhile, we in data processing have largely been facilitating this process. Like good soldiers, we have all too often been blindly following orders. We have been using the latest and greatest technology to make these actions not only feasible but low cost. Nonetheless, we in data processing have a unique vantage point about information handling that should be, but is often not, communicated to government policy makers. We should be willing to take more stands about information handling practices we consider right, decent and appropriate. It is hoped we will see more American actions like those taken by employees of an Italian company who recently went on strike because they recognized the system monitoring threats imposed by a password-based computer access control system.

Charles Cresson Wood
Independent information security consultant
San Francisco

Commodore's revolutionary PC

In "Sizing up computers: From supermicros to super supers" [CW, Oct. 27], Harvey Newquist writes, ". . . the introduction of the 386 chip will give personal computers — sorry, micros — the ability to operate with the speed and efficiency equivalent to some engineering workstations."

I was surprised Newquist did not realize that such a computer — Commodore Business Machines, Inc.'s Amiga — already exists. For those not familiar with the Amiga, I would point out some of its features: a Motorola, Inc. 68000 CPU, a multitasking operating system with built-in windowing, graphics, animation and sound and speech synthesis.

It can be upgraded to use 8.5M bytes of main memory, and upgrades exist that use a Motorola 68020 CPU with floating-point coprocessor to replace the 68000.

Software? Languages such as C, LISP, Modula-2, Forth and Fortran with fully capable compilers, including interfaces to the several hundred operating system routines, all for under $150. Paint programs to create high-resolution graphics with up to 32 colors selected from a palette of 4096, and animation programs to create sophisticated computer animations with three-dimensional effects for under $200.

Word processing with the ability to window and work with several documents at one time. Again, all under $200. Spreadsheets with real-time, three-dimensional graphics attached to cells so cell updates automatically and immediately update the graph.

The cost of this computer? About $2,000 with a megabyte of memory, internal and external 3½-in. disk drive, red-green-blue video monitor, operating system and several software packages.

There is no question that this machine is revolutionary. Since CW Communications publishes *Amiga World* magazine, maybe you should take Harvey over to see the Amiga, so he can have something more advanced to write about than a desktop IBM 4300.

Mark Cashmann
Data Processing Manager
Anocoil Corp.

***Computerworld** welcomes letters and publishes those it judges of greatest interest to its readers.*

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VIEWPOINT

The fantastic voyage: Charting a human-computer interface

Skip Walter clapped his hands together loudly, startling several people in the front of the meeting room.

Walter, Digital Equipment Corp.'s manager of business office services and applications and the "father" of All-In-1, was making a point.

He was telling the attendees at a recent industry executive forum about some of his explorations into the nature of communications, explorations that could eventually lead to the design of new and radically different office information systems.

Sophisticated methods

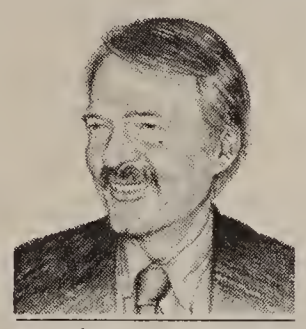
Right now, he said, the computer-human interface is primarily visual and character-based. It works fairly well. But every day, in the simplest person-to-person interchanges, human beings use far more sophisticated methods of assimilating, storing and communicating information.

To illustrate, Walter recalled a financial officer at DEC who used an interesting analogy to explain why substantial cash reserves were necessary for a fast-growing company.

It is like driving down a highway, the man said, in a car marked Income. Right behind you is another car with Expenses painted in big red letters on the side.

Now you know, for safety's sake, there should be a car's length of distance between your car and the car behind you — the safety zone. That is your cash reserve.

Now if you're driving at a sedate 10 mph, you don't need much space between vehicles. But here you are, clipping along the thruway at 60 mph in your souped-up, fuel-injected Income sports car. If you're without adequate cash reserves, you're racing down the highway with that Expenses car a mere four inches from your rear bumper. If your income falters for even an instant, what happens? Wham! And here Walter clapped his hands together, making his listeners jump.



By JOHN L. KIRKLEY

The story, he explained, took a dry accounting idea and made it understandable and memorable by appealing to all the senses we use to assimilate information — the visual (you can see the cars), the auditory (the hand clap) and the kinesthetic (you can feel yourself speeding down the road and sense in your gut the wrenching impact of two crashing vehicles).

What people want, Walter explained, is communication, not information. "I receive 100 mail messages a day," he said. "That's 600 to 700 pages of information. I can't physically scan, much less read to understand, all the trade publications and books I need to. Or talk with all the people I need to. I don't need more information; what I need is a way to capture and share knowledge. A way to communicate with others and with myself about the meaning of facts — not moving these facts back and forth."

Walter was delving into difficult questions. He was probing that often-explored but little-understood arena where people, processes and technology combine to form what he characterizes as a living, intelligent structure.

William Wordsworth, when writing about the modern scientific reductive method, which attempts to understand a process by chopping it up into separate pieces, said, "We murder to dissect." The point is that the intelligence of the structure cannot be isolated: It is enmeshed in the total structure itself.

To communicate knowledge across this living network of people, processes and technology, new and innovative methods of presenting information must be developed. They must involve our visual, auditory and kinesthetic senses.

To illustrate his point, Walter unveiled some proprietary research on which his group is working. He showed several short videotapes about a mundane subject — data base design.

But the tapes were far from mundane. The attendees saw the data elements in three dimensions and in color. Elastic connectors, fine white filaments, stretched between the data elements, visually indicating the web of relationships. It was reminiscent of the film *Fantastic Voyage*, in which the characters, miniaturized by technology, enter a man's body and use a tiny submarine to sail through the uncharted regions of his body.

Shifting relationships

In the DEC video, you move in three dimensions among the data, changing it, rearranging it, retreiving it, observing in real time how the relationships between elements shift.

More important, because of the way the data is presented, you are able to bring your intuitive faculties to bear as you roam this digitized landscape.

The videotapes were rudimentary, but the possibilities are fascinating. Imagine adding sound and a joy stick. You could zoom among the towering structures that you have built like a intergalactic fighter pilot from *Star Wars*. Others could join you in this network of information and ideas, and, like explorers mapping uncharted territory, you together discover new relationships, new roads to explore. Unlike real life, if you fall off a cliff, it's not fatal; you simply push the reset button and try again.

As Walter sees it, the next step is deceptively simple but hard to realize: the design of human interfaces that use sound, pictures and movement. As this approach develops, we will be making the first tentative steps toward tapping the tremendous capabilities latent in the partnership between man and technology.

Kirkley, a former editor of Datamation *magazine, is an industry consultant currently acting as editorial advisor to Patricia Seybold's Office Systems Group.*

Seek elegance of architecture in reduced instruction set design

Open any computer newspaper or magazine and you'll run into the term reduced instruction set computing (RISC). Everyone's getting into the RISC act: new firms such as Ridge Computers Co. and Pyramid Technology Corp. and old ones such as Hewlett-Packard Co. and IBM. RISC is a headline-writer's godsend: You read about "RISC-y Business" or "Taking a RISC." But is RISC an MIS manager's godsend or nightmare?

RISC represents an approach to designing a computer's instruction set. Every computer has one. It defines the individual steps by which compilers break down statements such as ADD TAX TO BILL GIVING TOTAL. Cobol programmers don't see these steps. The designer's challenge is to pick a set of step types that suit Cobol (or whatever) and can be built cost-effectively with the available technology. Computer designers have debated the ideal instruction set for decades.

Through the early 1980s, the trend was to make the instruction set as comprehensive as possible. "Let's define a single instruction to do the Cobol PERFORM . . . VARYING," said one designer to another. "Amen," said the second. "And while we're at it, how about PL/I DO WHILE?" So it went. Digital Equipment Corp. used to advertise that its PDP-11 systems had over 400 different instructions. The VAX has more.

There are mavericks who buck every trend. Complex instruction sets were no exception. The Control Data Corp. 6600 of the mid-1960s had few instructions, but they were carefully chosen and ran faster than anything else at the time.

By EFREM MALLACH

Instruction types

The Data General Corp. Nova of the late 1960s, at the other end of the price spectrum, was similarly stripped down. It had few different instruction types, so it executed more instructions per job than its more richly endowed contemporaries. But with so few instruction types, its designers could make each of them blindingly fast. The net effect was, approximately, a tie.

Now major vendors are following the same philosophy. Hewlett-Packard Co. has bet its corporate future on the RISC-like Spectrum project. The IBM RT Personal Computer was the first commercial appearance of a RISC project that had been under way internally for years.

The arguments for the approach sound good. The KISS principle — Keep It Simple, Stupid — is always valid. Complex instructions are rarely used, since people don't really know how to write compilers that use them effectively. Meanwhile, they weigh down a computer with hardware that is needed if and when a program does use them. This hardware is a potential area for design errors and failures and could, in any case, be better used to make the really useful instructions go faster. Or so RISC proponents say.

Having heard more than one sales pitch for a RISC system, I must agree that the arguments sound logical. RISC may be a better approach to instruction set design. Less is more, and all that. But should DP managers selecting new systems care? In 90% of the cases, they shouldn't. A computer is built with some amount of hardware and runs at some level of performance. The amount of hardware determines (to a first approximation) the reliability of the electronics and has a relationship to processor cost. The level of performance is what it is, no matter how it is achieved.

Elegance of internal architecture is a matter for legitimate engineering pride. But it is seldom a concern of users. True architectural elegance will show up in the performance obtained with a given amount of hardware. User managers should care about that.

Elegant design

If a computer has the best price/performance for a job (other factors such as software and support being equal), it shouldn't matter if it was designed with RISC or peanut butter. If it doesn't, elegant design will not make up for these deficiencies.

As an engineer by training and a computer architect by experience, it pains me to reach this conclusion. But I can honestly reach no other. If somone comes to your office proud of his new RISC system, listen. But listen not to why RISC architecture is wonderful but to what it offers you.

If it really is wonderful, it will offer tangible benefits in price/performance or other areas. Look for the benefits, not the buzzwords. Seeing the truth through the terminology is part of what you're paid for.

Mallach is associate professor of computer science at the Boston College School of Management and a consultant to top managers of vendor and user organizations.

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SOFTWARE & SERVICES

SOFTALK
Thomas O'Flaherty

In search of the racer's edge

There are few areas of U.S. business that do not take the issue of competitive advantage seriously.

But it has been only in the past few years that computers and information have begun to be seen as a key part of competitive advantage.

Thinking is still unclear on the opportunities (and limits) of computing's role in establishing an enterprise's competitive advantage. Textbook examples range from airline reservation systems to order/inventory systems, such as that pioneered by American Hospital Supply.

But that is history. What have computers done for companies lately? Consider for a moment the increasing standardization at all levels of computing since the early 1970s:

- For new applications, IBM's mainframe architecture is nearly always selected. The IBM Personal Computer family is also a de facto standard.
- Communications and communications protocols are also increasingly standardized; witness the surge of hardware manufacturers offering their own, presumably compatible, version of IBM's Systems Network Architecture (SNA).
- In the software area, a common systems software environment is emerging. The resources and the risk involved makes the chances quite small, for example, of an analogy to

See **IN** page 21

O'Flaherty is a principal of Information Service Strategies, N.Y.-based consultants on improving the effectiveness of information systems.

Specialist: Reusable code helps increase productivity

By Ninamary Buba Maginnis

CAMBRIDGE, Mass. — Firms that do not organize libraries of zero-defect, reusable software could be jeopardizing their businesses, according to T. Capers Jones, chairman of Software Productivity Research, Inc. and author on productivity measurement.

"Reusable code is taken seriously in Japan and should be here too," Jones said, speaking at the Strategic Issues in Managing Information Technology conference here last week.

"To me, this is the most important branching point. In the long run, it will determine which companies will stay in business and which ones won't."

It takes about 36 months to develop a large application today, Jones said. By 1990, if a company has a good reusable-code library, development time can be cut to six months. Without such a library, development time will still take 24 months, he said.

The results of a California study proved that software systems are highly redundant, with 75% of application code, 50% of systems programs and 70% of telecommunications programs sharing identical code or functions, according to Jones.

Jones, who spoke at a conference sponsored by Cambridge-based Decision Support Technology, Inc., offered some suggestions to aid companies in organizing reusable-code libraries.

- Teach programmers commonly used routines.
- Build unique extensions on generic base programs.
- Include common routines as statements in high-level languages, catalog

See **REUSABLE** page 20

DG, GE to offer factory software

System manages shop floor activities, communications

By Rosemary Hamilton

DETROIT — Data General Corp. has teamed up with General Electric Co. to market factory management software developed and currently used by GE.

The DG/Factory Management System (DG/FMS), announced at the Autofact '86 trade show and conference held here earlier this month, will be available in the near future, according to a DG spokesman. It runs on the DG line of Eclipse MV superminicomputers and was designed to manage shop floor activities as well as factory communications.

"DG's intent is to sell more MV systems in the factory environment, which has traditionally been Digital Equipment Corp.'s domain," said Anthony Friscia, president of Advanced Manufacturing Systems, a consulting firm in Chicago. "What will sell this system isn't the hardware; it's the capability of the software. This gives DG an entree that they haven't had before."

DG also said the software would include support of the Manufacturing Automation Protocol, the emerging factory communications standard, by mid-1987.

In addition to marketing support, GE will provide consultation for the installation and customization of the system through its Consulting Services Corp., according to DG.

DG will provide hardware and software interfaces for the factory floor devices and the DG equipment that will manage those devices.

The software, which has been in use at one of GE's steam turbine generator plants since 1984, can be tailored for a variety of manufacturing procedures, DG said. A base price for a total package, which would include DG/FMS, hardware and con-

See **DG** page 20

Genesys development system allows customer modifications

Modules add function to old, new applications

By Charles Babcock

LAWRENCE, Mass. — A producer of mainframe human resource packages is offering a dictionary-based development system that works in conjunction with the firm's applications.

Genesys Software Systems, Inc. of Lawrence has introduced the AL 2000 development system, which includes Historian, Reporter and Manager modules working in conjunction with the dictionary to add functions to Genesys applications or develop auxiliary applications.

Genesys offers standard human resources applications, including payroll and medical claims, and will include the development system in conjunction with the purchase of any of them, according to Michael W. Miller, vice-president of marketing.

Run under PC-DOS, MVS

He added that the applications are priced at $37,000 for payroll, for example, running under the IBM PC-DOS operating system, and up to $113,000 for the same application running under IBM's MVS and IMS.

With such a system, end users in personnel at a bank in Pennsylvania were able to modify their insurance claims system to meet the requirements of the federal government's Consolidated Omnibus Budget Reconciliation Act, Miller said.

The 1986 law requires companies to give former employees the option of extending their health insurance coverage for 18 months.

Miller pointed out that a bill sponsored by Sen. Edward Kennedy (D-Mass.) requires employers to pay for the first four months of coverage. If such a modification is adopted, it would be possible to modify the Genesys systems without extensive programming, Miller claimed.

Generates additional screens

The data dictionary of the system includes a screen generator that can be used to generate additional screens in an application.

The Historian module archives human resource data automatically, allowing a programmer to modify historical data used with standard applications or to create new application histories, Miller said.

The Manager module runs the applications and routinely does repetitive tasks such as calculating pay and deductions or enrolling a one-year employee in the company's profit-sharing plan.

Electronic generation

The Reporter module can generate electronic, magnetic or printed reports from information in the system.

Genesys is a 6-year-old, privately held company that emerged from Wang Laboratories, Inc. The firm was formed after Wang purchased the human resource systems of Phil Hankins, Inc.

Eighteen former workers in the Wang human resource applications section bought the rights to the software and formed a company that now employs 124, Miller said. Genesys reported revenue of $9.9 million at the end of its fiscal year ended June 30.

INSIDE

AI Laboratory director says expert systems must attack problems with models and other representations/**20**

NEW THIS WEEK

- The Bridge enhances its Trak project management software
- For more on this and other new products, see pp. 69-76.

INSTANT ANALYSIS

"We don't have much occasion to work within the Procrustean confines of existing shells."

— Patrick H. Winston, Director of the MIT Artificial Intelligence Laboratory in answer to a question on expert system shells.

MIT director: AI must expand problem models

By Charles Babcock

CAMBRIDGE, Mass. — Expert systems builders need to expand the ways they represent problems until they can attack them from "multiple levels of abstraction," said Patrick H. Winston, director of the artificial intelligence laboratory at MIT.

Two of the most common methods of problem solving, frequently encapsulated in commercial expert system shells, involve forward or backward chaining. They use a series of IF-THEN rules to match conditions to conclusions that push a reasoning process along a predetermined path.

In an address to the Strategic Issues in Managing Information Technology conference last week, Winston cited an example of how an adder malfunction could be corrected by using a model without resorting to forward or backward chaining. An adder is the logical device in a microprocessor that executes arithmetical addition. When the adder yields erroneous results, a comparison of a model of the adder with a series of results can pinpoint the error.

"Rule-based systems are real idiot savants. They don't use models. They don't use experience — not much, anyway. They don't exhibit common sense," he noted. Mycin, an expert system for diagnosing medical cases, once prescribed a barrel of penicillin for a patient because of a data entry error, Winston recounted.

Rule-based systems attempt to reduce a process in the real world to a set of rules. A model is another way of representation. In the future, "good systems may require more than one representation," he said.

Winston criticized the tendency to write expert system shells in C or Cobol instead of the symbolic processing languages, LISP and Prolog. By working in Common LISP, which he called an industry standard for LISP, developers can get the portability of C but keep the symbolic processing language's strengths. The inefficiency of symbolic processing languages is a "disappearing myth" that originated with inefficient compilers, he said.

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HARRIS

Reusable code said to aid productivity

From page 19

them in a module or macro library and embed them in menu-driven systems such as program generators.

• Share the same programs across units.

Aside from reusable-code libraries, there are other ways firms can improve productivity. For example, Jones said, if a software salesman tells you that buying a certain tool will give your company instantaneous productivity, do not believe him.

"It may not be the right tool for you," Jones warned. Often a site visit can help potential buyers examine pragmatically what tools are being used, Jones said.

Productivity is sociological as well as technological. "When Hartford Insurance wanted to introduce new technology, they made a major campaign out of it," Jones noted. "People will fight it tooth and nail unless you encourage acceptance," he said.

Training is necessary for any productivity gains, Jones noted. Approaches in developing software change so often that key people need to be updated constantly. "Those who provide 10 to 20 days' training per year have more productivity than those without any training."

Productivity gains can be divided into four groups, or plateaus, according to Jones. For a 5% to 25% improvement, a company using a single technology should use structured code, high-level languages, reviews and inspections and interactive tools and terminals.

To jump to the second plateau and a 25% to 50% improvement, a firm must combine several technologies, including design control, design reviews, code inspections, structured code, high-level languages and direct coding aids.

Reaching the third plateau and a 50% to 75% productivity improvement means hiring superstar personnel, using program generators and standard functional modules. To arrive at the fourth plateau and improvements greater than 75%, developers must make extensive use of program generators and standard function modules, Jones said.

DG, GE to offer factory software

From page 19

sulting services, is $200,000, while a typical system would cost between $500,000 and $1 million, DG said.

DG/FMS is made up of three integrated modules: Factory Communications, Shop Floor Control and Distributed Numerical Control. The Factory Communications portion manages a factory network connecting shop floor terminals. Shop Floor Control automatically schedules jobs and tracks those jobs as well as the status of shop floor equipment. The Distributed Numerical Control module handles the electronic transmission of numerical control instructions from a minicomputer to the machine tool that will actually perform the job.

In search of the racer's edge

From page 19

the Airline Control Program emerging now to fill a similar specialized need.

• Similarly, the expense, time and risk of developing homegrown applications has produced a large and growing packaged applications industry in the last decade.

But if most companies are using similar hardware, software and communications environments, how will any one of them gain a competitive edge?

This is an issue that only a few companies are grappling with, partly because only a handful of organizations are currently addressing in a coherent fashion the question of how to use computers to gain and keep a competitive edge.

Most other enterprises are still, implicitly, treating computer systems as support tools, the same way

If most companies are using similar hardware, software and communications environments, how will any one of them gain a competitive edge?

they treat surrounding business functions like personnel, inventory, order entry, accounting, manufacturing and so on.

Competitive advantage systems are, by their nature, not support systems. There are several problems in having an off-the-shelf system performing competitive advantage functions:

• Management feels uneasy if its computer system, dedicated to proprietary uses, is about the same as everyone else's.

• Management may feel even more uneasy if the underlying software is supplied (and maintained) by a third party.

• Even if it makes sense to have industry-standard computer systems, what happens if the enterprise's business operations are not, in fact, industry standard? The problems of converting manual processes can range from daunting to impossible.

• What if, in fact, these underlying nonstandard processes make the enterprise unique and give it a competitive edge in the first place?

Most organizations could not and should not consider nonstandard hardware or communications solutions to business problems. While it might be feasible at a particular point in time, the organization that develops a nonstandard environment would have diverged from the mainline of vendor-sponsored future development.

To develop a follow-on generation of nonstandard hardware is expensive, and technical progress may be impossible. This is essentially the problem that has faced the BUNCH companies in the 1980s.

The software issues are far more interesting — and important. Software packages can play an important role in forming an information system for competitive advantage:

• Some "packages," like the leading fourth-generation languages, are building blocks that can be used to build totally unique applications.

• More typical applications packages, such as those used in the insurance or banking industries, offer so many options, tables, exits and so on that there is almost an infinite number of quite different systems that can be constructed.

However, any one company may only need a small percentage of the options. More important, these packages usually have a certain "point of view" that may not fit into an enterprise's way of doing business.

• To get around this, what some customers do is to buy a package's source code and use its framework and build their own unique system on top of the package's foundation.

• Ultimately, of course, some enterprises find themselves going full circle and writing applications themselves from scratch.

There are numerous permutations of these alternatives. But all the methods point in a common direction — distinguishing a common physical computing environment through the use of software.

Gaining the edge

Depending on software for important competitive systems may heighten certain risks. Successful companies get their advantage over less successful companies in several ways:

• Targeted markets/customers.

• Ongoing new products/processes.

• New marketing approaches.

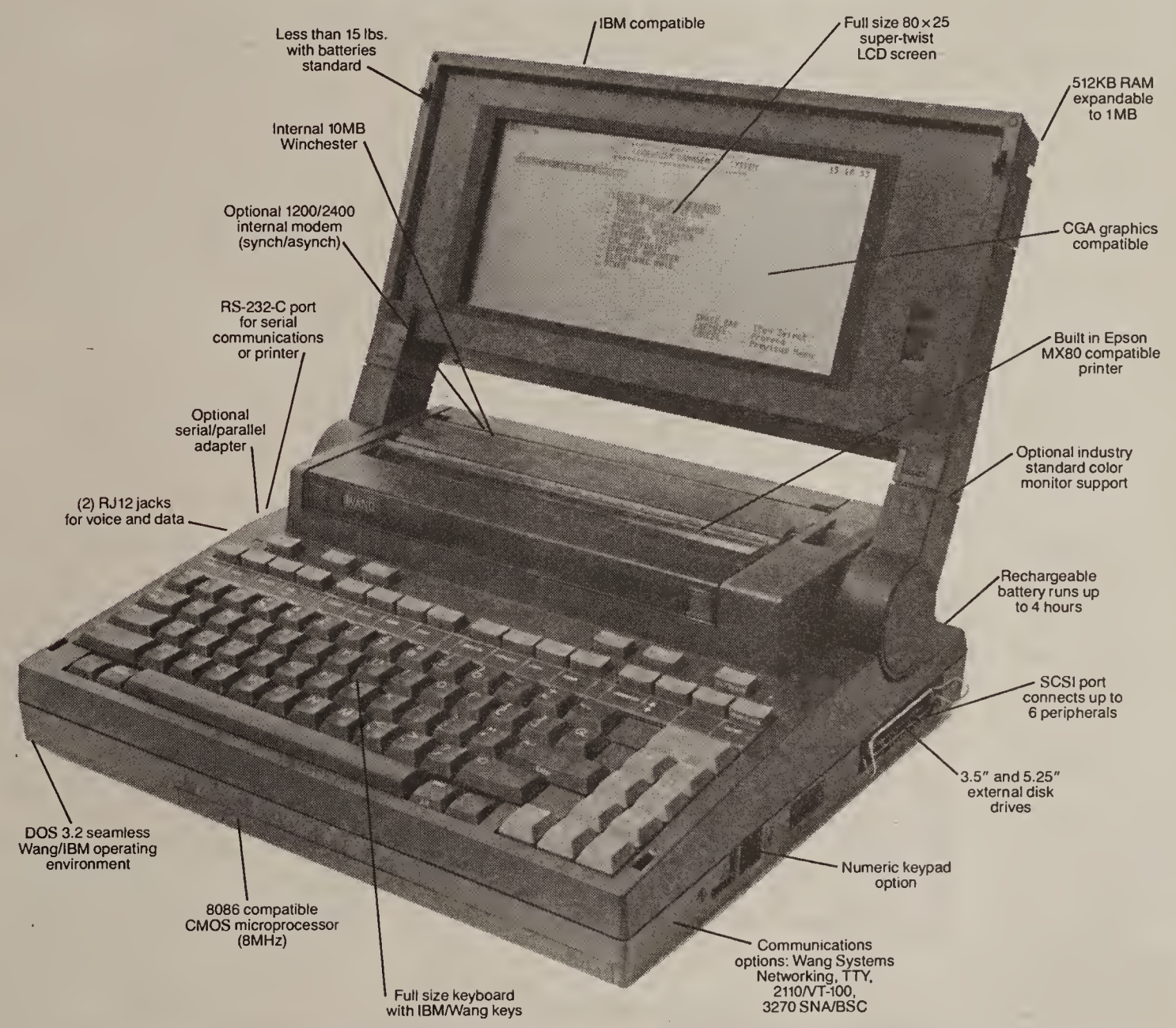
• Rapid entry, exit, response.

• Attention to quality and getting it right the first time.

All these things demand a quickly built system, many, even abrupt, changes in direction and not making many mistakes. This, unfortunately, does not remind me of most custom-built software that I know. There is a tendency, in fact, for systems to be developed slowly and be quite fragile when completed.

Are there answers? There are certainly parts of answers, but there are no magic bullets nor approaches that do not have risks of their own. A later column will explore some of the ways that successful software can adapt to the need for competitive systems.

No other portable has ever been carried this far.



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Built-in Printer	Yes	No	No	No	No	No
Internal Herd Disk Drive	Yes	No	Optional	No	Yes	No
Both 5.25" and 3.5" Medie Support	Yes	No (3.5" only)	Yes	Yes	Yes	Yes
Internal Modem 1200/2400	Yes/Yes	Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
Wang Systems Networking VS Connectivity	Yes	No	No	No	No	No
SCSI Port	Yes	No	No	No	No	No
Battery Operated	Yes	Yes	Yes	Yes	No	Yes

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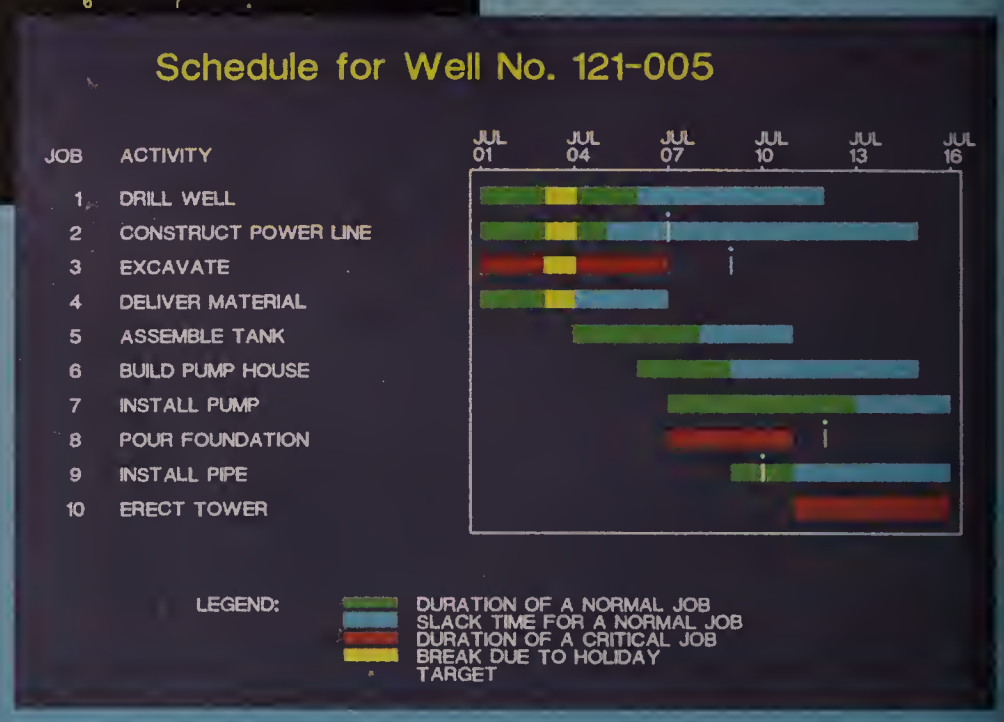

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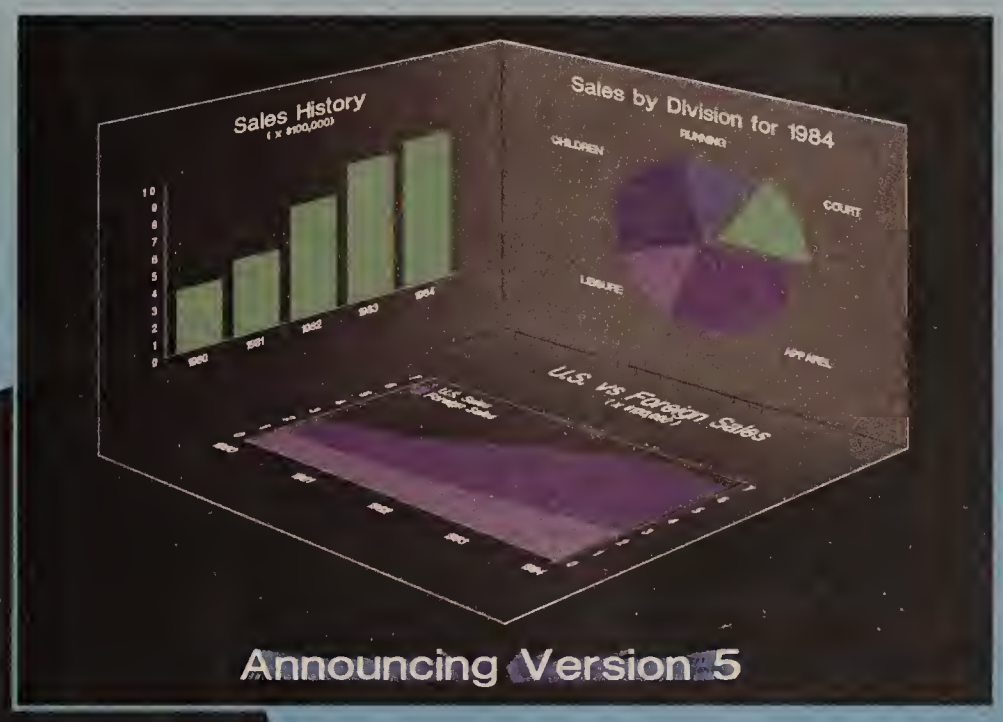

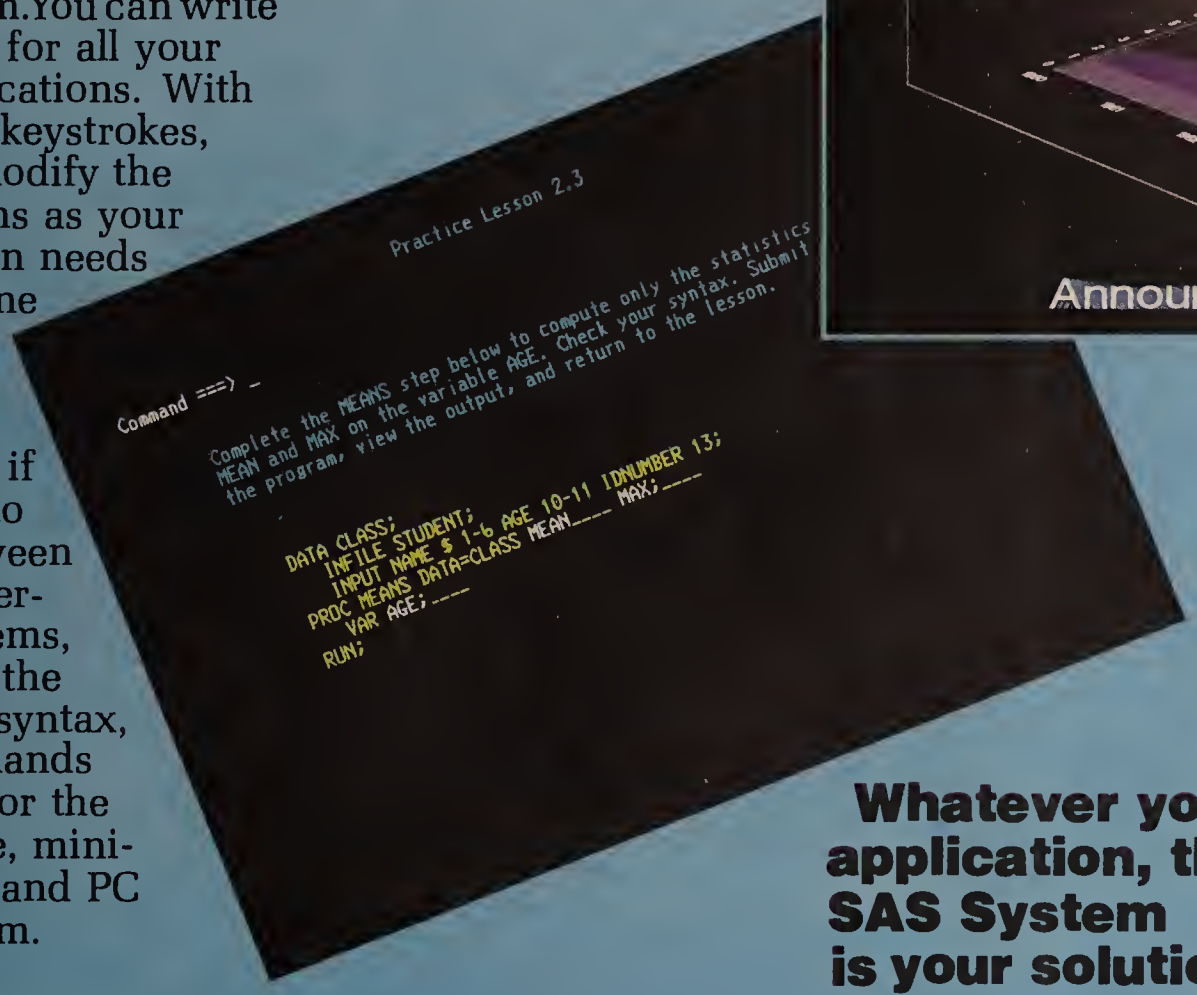

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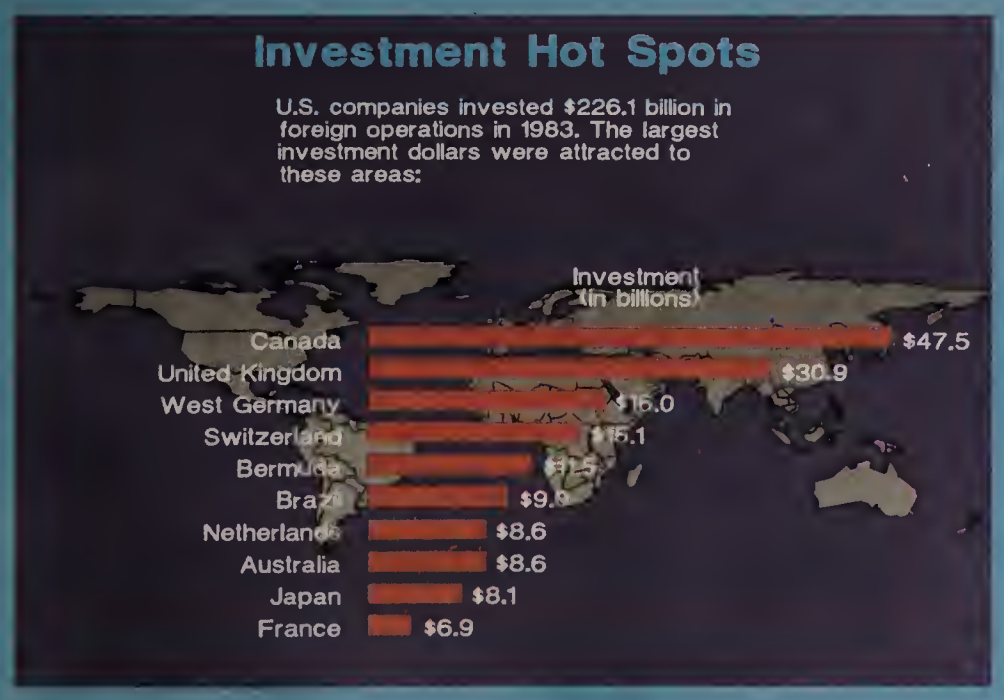

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SYSTEMS & PERIPHERALS

HARD TALK
James Connolly

Optical storage comes of age

A walk through the exhibits at Comdex/Fall '86 provided proof that a technology that was little more than experimental a few years ago has taken major strides toward general acceptance and practicality.

The technology is optical storage, and it is steadily overcoming some of the barriers it faced en route to use in everyday DP applications. It seemed every storage equipment and media vendor had an optical storage display at Comdex and that those were the displays that caught attendees' attention. But more significantly, unlike some earlier computer shows, Comdex offered a chance to see optical drives and media designed for all types of systems, from microcomputers to mainframes.

While one must keep in mind that some of what was being displayed may turn out to be vaporware from start-up companies that will not be in business a year from now, much of what was shown was demonstrable and backed by proven vendors. The names associated with optical storage included Eastman Kodak Co., Control Data Corp., Hitachi America, Ltd. and Maxtor Corp.

There were probably a half-dozen robotic or jukebox-style subsystems running in mechanical demonstrations. Dozens of other vendors showed media and drives ranging in size from 3½ to 14 in.

It appears that most of the legiti-

See **OPTICAL** page 27

Connolly is Computerworld's *senior editor, systems & peripherals.*

Pyramid answers DEC with RISC-based superminis

By Donna Raimondi

MOUNTAIN VIEW, Calif.— Pyramid Technology Corp. has introduced two reduced-instruction set computer (RISC)-based 32-bit superminicomputers geared to commercial data base and scientific software development users.

The Series 9000 systems are a response to Digital Equipment Corp.'s successful VAX series and to IBM's recent 9370 announcement, said Brian Daly, superminicomputer analyst at Datapro Research Corp. based in Delran, N.J. Pyramid compares the systems to the VAX 8700 and 8800 models.

The 9810 and 9820, which can contain up to 128M bytes of memory, use Pyramid's second generation of RISC processors. Like earlier Pyramid systems, they use off-the-shelf transistor-transistor logic processors with 100-nsec clock times, but the 9810 and 9820 include an added stage to the instruction pipeline to reduce register-to-register execution time from two cycles to one cycle, according to Paul Lego, manager of product marketing. The processors contain 128 instructions.

The 9810 and 9820 are single- and dual-processor systems, respectively. They can be expanded to support 256 users and more than 15G bytes of disk storage. The dual-processor model is a tightly coupled, symmetrical system.

Both models run under Pyramid's OSX operating system, which is a dual port of the University of California at Berkeley Unix 4.2 and AT&T Unix System V versions of Unix. They support 14 Unix-based data base management systems from companies such as Oracle Corp. and Relational Technology, Inc., which Pyramid says makes both models suited for on-line transaction processing applications.

Although the company is trying to spread out into the commercial mar-

See **PYRAMID** page 27

CDC line to target CAD/CAM

Integrates graphics, CPU in Unix-based Cyber

By Eddy Goldberg

DETROIT — Control Data Corp. has introduced its first Unix-based graphics workstation, the Cyber 910-300.

The 910-300 is the premiere model in a planned family of Unix-based graphics workstations that CDC views as a platform to support existing and future computer-aided design and manufacturing (CAD/CAM) requirements into the mid-1990s.

The Cyber 910-300 is based on the Iris 3100 from Silicon Graphics, Inc. of Mountain View, Calif., under an OEM agreement with CDC, according to Alan M. Christman, general manager of strategy and communications for CDC's Computer-Integrated Manufacturing division.

The system is intended for use with CDC's integrated computer-aided engineering and manufacturing (ICEM) system of CAD/CAM hardware and software. It was demonstrated at the recent Autofact '86 conference and exposition.

Christman said the 910-300 is the first CDC workstation in which the graphics and central processors are integrated. "There is a direct channel connection between graphics processing and application processing," he said. The system also reportedly features integration of communications support, peripheral support and operating software into a single unit. The operating system is AT&T's Unix System V Release 3.

In addition to an industry-standard Ethernet local-area network interface and a VME bus, the 910-300 features 4M bytes

See **CDC** page 26

INSIDE

IBM releases light-duty printer for System/36 and 38 processors/**26**

Pyramid Technology to offer PC-linking network systems/**27**

NEW THIS WEEK

- Texas Instruments offers Explorer workstations based on 182M-byte disk drives

■ For more on this and other new products, see pp. 69-76.

INSTANT ANALYSIS

"Parallelism is the most significant development since the stored program computer, and we don't know how to use it."

— C. Gordon Bell, assistant director, National Science Foundation Computer Science and Engineering Directorate, in a speech to the Fall Joint Computer Conference

Xerox workstation bows

By Rosemary Hamilton

STAMFORD, Conn. — Xerox Corp. plans to market an engineering workstation based on a Cimlinc, Inc. processor and software that will replace its current Professional Mechanical System.

The 2285 Engineering Workstation, which runs under the University of California at Berkeley's Unix Version 4.3, has a base price of $14,390. A color version starts at $19,190.

While the system is said to be compatible with the Professional Mechanical System, which is based on a Motorola, Inc. 68000 microprocessor, Xerox has not yet determined whether an upgrade package will be available to current users, said Arthur Zuckerman, a company spokesman.

The 2285 includes utilities such as multiple windows, pop-up menus and graphic icons. It also supports the Xerox Networking System protocol and Transmission Control Protocol/Internet Protocol, enabling it to communicate via an Ethernet network.

Targeted at mechanical engineers, the 2285 runs Cimlinc Pro Cad computer-aided design software, which will be licensed separately for $6,495.

A entry-level system comes with a 19-in. monitor, a 68020-based CPU and Motorola 68881 floating-point coprocessor and 4M bytes of memory, expandable to 12M bytes. Memory can be added in increments of 4M bytes, which cost $3,795 each. Each system comes with a storage module that contains an 86M-byte Winchester disk drive with one of three options: a 1M-byte floppy disk drive, a 40M-byte tape cartridge or a second 86M-byte hard disk drive.

Optical computers could shatter processor performance barriers

By Karl Reed

DALLAS — Optical computer systems offer computer designers a chance to break away from the von Neumann bottleneck that has become a limiting factor in CPU design and performance, according to a researcher from AT&T Bell Laboratories, Inc.

"The modern computer design concept was developed as a means of avoiding the need for vast amounts of parallel connections in the implementation of a computer. However, it turns parallel operations into serial ones," researcher Alan Huang said during a presentation at the recent Fall Joint Computer Conference.

"But God did not decree that all computers should be built thus, despite what many current designers say. It would be far better to have some means of allowing many parallel connections. But this is not possible with physical wires and is even more difficult with integrated circuits," Huang added.

Huang claimed light waves do not suffer the same restrictions and that it is possible for multiple light beams to pass through a single optical medium without interfering with each other, thus making massive parallelism possible. He also maintained that the basic building blocks for optical computers are already available, noting, "We could build one now but we have to be able to get more than a factor of 10-speed improvement."

The researcher, who claimed to have developed a set of computation

See **OPTICAL** page 26

CDC line aimed at CAD/CAM

From page 25

to 16M bytes of memory, high-speed interactive real-time graphics, distributed processing and an open architecture.

Custom very large-scale integration circuits dedicated to graphics transformation and geometry acceleration are used to boost the 910-300's performance. When pipelined or operated in parallel, the processors can manipulate data at more than 110,000 transformations per second for three-dimensional objects and 130,000 transformations per second for two-dimensional objects.

> ***Custom very large-scale integration circuits dedicated to graphics transformation and geometry acceleration are used to boost the 910-300's performance.***

The system, which uses a Motorola, Inc. 68020, is available now and can use any Unix-based CAD/CAM application software, Christman said. "Users can communicate and pass files between this system and other Cyber systems," he added. For example, a user can create a model on the 910-300 workstation, analyze it on a larger Cyber system and pass it back to the 910-300 for display. CDC's ICEM application software will be available for the 910-300 in mid-1987, Christman said.

Prices for the 910-300 workstation start at about $40,000. A base system includes a 19-in. monitor, 4M bytes of main memory, a 72M-byte disk, Ethernet controller, eight bit planes, a C compiler, editor, linker and extended file system.

Optical systems can break barriers

From page 25

rules that allow optical processing to be effective, said that vastly increased processing speeds — up to 100G floating-point operations per second — would be possible with optical processing.

He also said there is an absence of skew in optical processors. "Digital signals are delayed by different amounts in a computer, and handling this skew is one of the major design problems and limits performance. Optical signals can be processed through a single logic element with a skew of about 10 femtoseconds, eliminating the skew problem," Huang said, noting that a femtosecond equals one millionth of a nanosecond.

Reed is Consultant Editor for Australasian Computerworld.

IBM adds supplemental printer for small jobs

Designed as low-usage tool for System/36, 38

By James Connolly

CHARLOTTE, N.C. — IBM has introduced a light-duty printer designed to off-load small print jobs from primary printers attached to IBM System/36 and 38 minicomputers.

The IBM 4210 nine-wire dot matrix printer was designed as a low-usage complement to a systems or workstation printer such as the IBM 4224 or 4234, with the 4224 or 4234 being reserved for larger data processing tasks. IBM officials said the 4210 would handle off-loaded jobs such as brief reports, letters and memos.

In large office settings where remote printers are needed, the 4210 can be placed up to 5,000 feet from the host and attached via twinaxial cable. The printer reportedly resembles the IBM 4202 Proprinter XL, which is IBM's wide-carriage printer for the IBM Personal Computer. It reportedly allows cut-sheet paper and envelopes to be inserted without removing single-part continuous paper.

The printer, priced at $1,800, was designed to print up to 200 char./sec. in data processing mode and up to 40 char./sec. in near-letter-quality mode, with the print modes being selected from the operator control panel or the host application. Developed and manufactured by IBM's Information Products Division in Charlotte, the printer is available now.

IBM also announced a multipen plotter designed for use with the IBM RT Personal Computer and other IBM PCs. The 6184 Color Plotter was designed as an entry-level plotter and is supported by IBM's computer-aided design and manufacturing applications, Cadam, Inc.'s Professional Cadam and various other third-party packages.

The plotter, which costs $5,400, features a 7.4M-byte data buffer and an eight-pen carousel with automatic pen changing and pen capping.

Optical storage comes of age

From page 25

mate vendors have channeled their enthusiasm about optical storage. They seem to recognize optical storage's limitations as well as its capabilities.

For example, Kodak officials billed their 6.8G-byte, 14-in. optical-disk subsystem as being suitable for use with superminicomputers and mainframes.

But those same officials note that they do not see the product replacing magnetic storage. Optical technology, at present, does not offer the performance in terms of access times or, in the case of the large disks, the erasability that magnetic disks provide.

Vendors at Comdex did not seem to be promising all things for all people or claiming that tiny, specialized markets will carry the day for optical systems, as some start-up vendors were saying about two years ago.

> ***Kodak officials note that they do not see the product replacing magnetic storage.***

Instead, exhibitors seemed to be concentrating on how optical storage can work in conjunction with magnetic storage.

They said optical technology can work well as a random-access storage device in commercial data base applications and in image processing applications — jobs where the price per megabyte of an optical drive justifies slower access times and write-once limitations.

In cases where the proposed applications may be relatively new, such as image processing, it is clear they are significant markets.

Thus, it may be that optical storage is years away from replacing magnetic tape in most backup situations and many more years away from bumping magnetic disk drives out of interactive computing applications.

However, it is becoming clearer that optical storage can carve out its niche in the industry and that vendors are closer to being able to serve that market.

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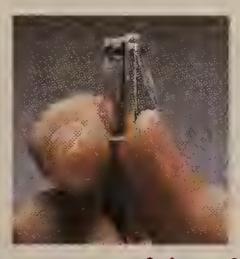

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The right choice.

Pyramid links 98XE systems to varied PCs

By Peggy Watt

MOUNTAIN VIEW, Calif. — Superminicomputer manufacturer Pyramid Technology Corp. will reach into the microcomputer world with a product line that links its own systems with other vendors' diverse personal computers on the same network.

The Pyramid Connection is a series of integrated networking products built around Pyramid's systems as hosts and connecting to IBM Personal Computers and compatibles, Apple Computer, Inc. Macintosh networks and Sun Microsystems, Inc. units.

Pyramid will resell communications products from Kinetics, Inc. in Walnut Creek, Calif., and Centram Systems West, in based in Berkeley, Calif., as well as certain Sun models as part of the Pyramid Connection, said David Gewirtz, manager of strategic marketing and business development.

"For Pyramid, this is an unusual move," Gewirtz noted. The PC and Sun links are through Unix and Ethernet, and the Macintosh connection is by an Ethernet/Appletalk gateway.

PC networking software

A Pyramid 98XE with software for PC networking with 16 PC-NFS links to Sun workstations and 16 Unix terminals, configured with a 470M-byte hard disk, tape backup and 4M bytes of memory, costs $161,270.

The same Pyramid 98XE configuration with software to support up to 31 Macintoshes through Ethernet/Appletalk costs $161,634.

Kinetics' contribution is its Fastpath Appletalk/Ethernet gateway, which enables Appletalk networks, such as those running Macintoshes, to communicate with a Pyramid host.

Pyramid implemented a Unix version of Centram's TOPS distributed file system to link Macintoshes and PCs.

Pyramid RISC superminis out

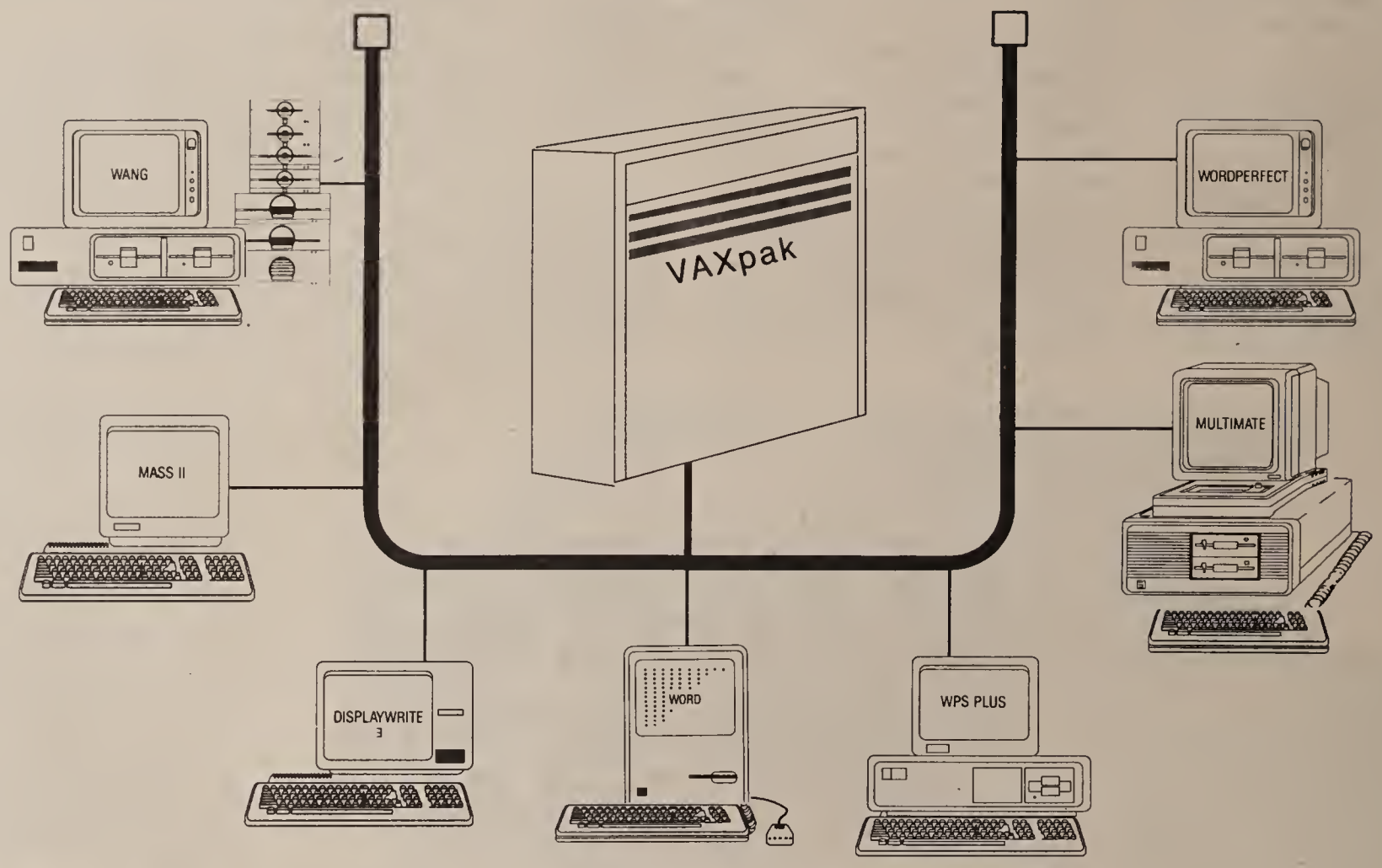
From page 25

ket, it has been better received in the university and research areas, Datapro's Daly said.

A standard configuration of the single-processor 9810 costs $200,000. According to the vendor, this configuration includes 16M bytes of memory, 16 RS-232 ports, a 470M-byte Winchester disk drive, a ½-in., 100 in./sec. streaming tape drive, a system console, Ethernet and an OSX license for 16 users.

The dual-processor 9820, in a configuration that costs $300,000, includes the same memory and storage as the 9810 but is ported and licensed for 32 users. Both systems will be available in first-quarter 1987.

DEC provides connectivity.



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COMMUNICATIONS

AT&T to sell supplier link with Cad Cam

By Elisabeth Horwitt

The combined sales force of AT&T's Communications and Information Systems divisions will be trained to market a new service from Cad Cam, Inc., which the Dayton, Ohio, time-sharing company claims could help U.S. manufacturers compete more effectively with overseas companies.

Called Wide-Scale Shared Data Operations Management (WSSDOM), the joint AT&T-Cad Cam venture targets manufacturers that distribute components to third-party suppliers. WSSDOM enables manufacturers to minimize overhead and significantly lower the distribution cost of components. The service increases competition by providing a low-cost way for small companies to take part in the bidding process, according to Cad Cam spokesman David Falter.

"Many businesses today use their current suppliers repeatedly, not because they are the best, but because the cost of finding better ones is prohibitive," Falter explained. "A lot of them think they have to go offshore for inexpensive components. We hope to help U.S. suppliers produce parts more cheaply and allow small suppliers access to bids they otherwise couldn't consider by minimizing their administrative costs."

WSSDOM also improves the efficiency and accuracy of supplier-manufacturer communications by enabling manufacturers to provide suppliers with graphic representations of design specifications, Falter noted.

The joint venture "enables AT&T to play in the CAD/CAM [computer-aided design and manufacturing] industry without having to sell physical CAD/CAM hardware," said Allan Torrey, AT&T market manager.

A manufacturer wishing to distribute a component would send the request for proposal (RFP), along with technical specifications and graphics, to Cad Cam's data base over AT&T lines, Falter explained.

See **AT&T** page 32

Tandem gives PCs local ride

Multilan ties processors through IBM's Netbios

By Stanley Gibson

CUPERTINO, Calif. — Tandem Computers, Inc. last week announced Multilan hardware and software that allows IBM Personal Computers on a local-area network (LAN) to access Tandem fault-tolerant on-line transaction processing systems.

"This is not another LAN, but a way to integrate PCs with Tandem systems through a variety of LANs," said Dennis McEvoy, Tandem vice-president of software. McEvoy claimed a Tandem computer used as a file server in the system is the first fault-tolerant distributed file server in the industry.

Multilan provides products that connect Tandem systems to IBM's Token-Ring Network, IBM's PC Network, Ungermann-Bass, Inc.'s Net/One, Sytek, Inc.'s System 6000 and other LANs that are based on the IBM Netbios software interface, according to McEvoy. PC users can gain access to Tandem files using IBM PC-DOS and Microsoft Corp. MS-DOS commands, he added.

IBM has yet to announce gateways for its own System/88 fault-tolerant computer to any PC network. Stratus Computer, Inc., which manufactures the System/88 for IBM, said it offers no direct PC to LAN links, although it intends to do so in the future.

Tandem also introduced Wordlink software, which uses IBM's Document Content Architecture (DCA) to provide document exchange between incompatible word processing systems. Incorporating document translation software licensed from SoftSwitch, Inc., Wordlink can operate both in batch and interactive modes. As a document formatting protocol developed by IBM, DCA is supported by a growing number of vendors as a common interim format for translation between incompatible word processing systems.

In a typical application, Wordlink can enable Wang Laboratories, Inc. VS 100 or Office Information System workstations to send revisable form documents to an IBM Displaywriter or IBM PC via a Tandem system, according to the vendor.

Omri Serlin, president of Itom Interna-

See **TANDEM** page 30

Micros get Bridge over Token-Ring

Terminal emulation, file transfer access hosts

By Elisabeth Horwitt

SAN FRANCISCO — Bridge Communications, Inc. unveiled terminal emulation and file transfer software that enables IBM Personal Computer users to access multiple hosts across an IBM Token-Ring network. The introduction was made at the Localnet '86 conference held here last week.

IBM PCs running Tokenterm software can emulate virtually any terminal, accessing a variety of asynchronous hosts via Bridge's CS/1-TR Token-Ring Communications Server, according to the Mountain View, Calif.-based firm.

"We're finding a very high level of interest in the IBM Token-Ring at the PC level, especially since IBM products for connecting the rest of its systems into the Token-Ring are six to 18 months away," said Bridge President William Carrico.

The anouncement is part of an important trend toward "high-speed, virtual environments in which the PC can access multiple host systems as one," said David Terrie, president of Boston-based Newport Consulting. "By 1989, terminal-to-host revenue will have flattened out, and the real game will be local-area networks providing high bandwidth PC-to-host connectivity."

Tokenterm features a built-in emulator for Digital Equipment Corp. VT100 and VT52 terminals. A program interface sup-

See **BRIDGE** page 33

INSIDE

Communication Machinery introduces an ISO compiler/**30**

Ungermann-Bass bridges Ethernet, Token-Ring/**32**

NEW THIS WEEK

- Sytek introduces a high-band version of its System 2000 broadband LAN
- For more on this and other new products, see pp. 69-76.

INSTANT ANALYSIS

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— John Clancy, president, McDonnell Douglas Manufacturing Industry Systems Co.

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COMMUNICATIONS

OSI compiler simplifies applications building

By Peggy Watt

SANTA BARBARA, Calif. — Communication Machinery Corp. last week announced an advanced compiler that reportedly simplifies the task of developing applications that support the Open Systems Interconnect (OSI) protocols. OSI, developed by the International Standards Organization, is an emerging standard that provides hooks for various communications applications, such as file transfer and electronic mail.

Communication Machinery's new ASN.1 compiler codes and decodes data packets directly from C-language structures, enabling OSI applications programmers to "sidestep the laborious task of manually encoding the protocol data units in a very complex language syntax, Abstract Syntax Notation One (ASN.1)," according to Communication Machinery. "It allows [OSI] programmers to spend most of their time in C," said product marketing manager Jim Soriano.

According to Communication Machinery, the ASN.1 compiler is intended largely as an implementation for programmers developing systems to work in Manufacturing Automation Protocol (MAP) and Technical Office Protocol (TOP) environments. ASN.1 will target large customers, OEMs and systems integrators that are developing software applications under either MAP or TOP.

The compiler should also ease the programming load of migrating application and session-layer protocols from existing MAP Version 2.1 and TOP Version 1.0 implementations to the future MAP and TOP Versions 3.0, according to Communication Machinery President Stephen Holmgren.

The compiler includes libraries that work with various C compilers, and it provides source and object code for rapid updating, Soriano said. It was designed to be used with Communication Machinery's kernel protocols of File Transfer and Management and Common Application Services Elements. File Transfer and Management outlines specifications for file transfer, and Common Application Services Elements outlines specifications for program-to-program communications within the OSI protocol set.

The advanced ASN.1 compiler will be available as part of Communication Machinery's new OSI upper layer protocol package, which is priced at $19,750 plus per-copy royalties for resales.

Current customers of Communication Machinery's File Transfer and Management and Common Application Systems Elements kernel software will receive the new compiler at no charge. File Transfer and Management 1.0 costs $15,000, and Common Application Systems Elements costs $5,750 plus royalties.

Tandem gives PCs local ride

From page 29

tional Co. in Los Altos, Calif., said the new products will enable customers to get added use from their equipment. "The demand is from customers who already use a Tandem mainframe but also have a lot of PCs," Serlin said.

Although the new products will be sold principally to present customers, Serlin said additional sales could come in the departmental computing market, especially where the data integrity offered by fault-tolerant Tandem computers is important.

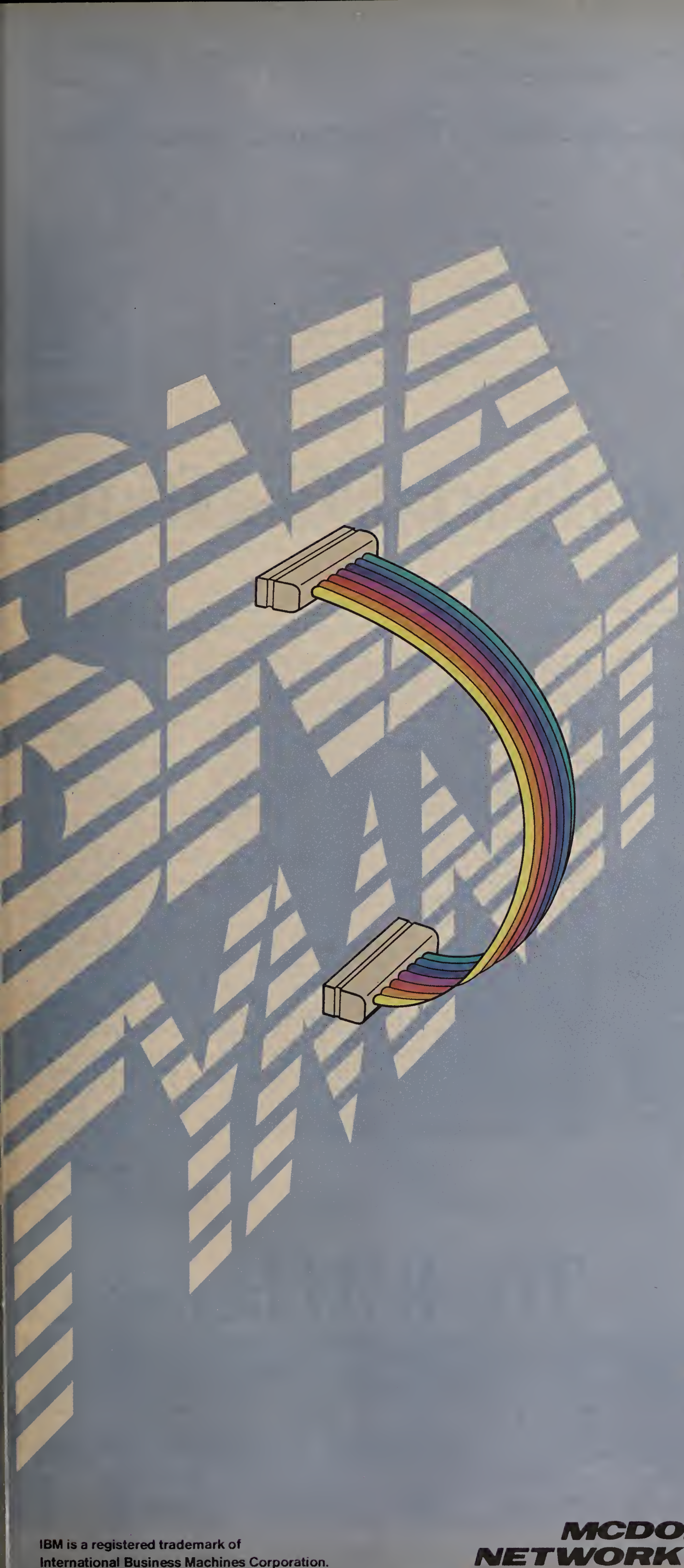
Multilan hardware consists of a dual-ported LAN controller, priced at $4,000, that resides in the Tandem system and a Multilan attachment device, priced at $4,000, that provides the connection to the user's LAN.

Multilan software consists of file and printer server software that runs on Tandem systems. The package is available for a $6,400 initial license fee and a $300 monthly charge for Tandem Nonstop VLX, TXP and II systems; a $3,200 initial license fee with a $150 monthly charge for Nonstop EXT25s; and no initial license fee and a $75 monthly charge for Nonstop EXT10s.

Wordlink software carries an initial license fee of $4,000 and a monthly charge of $150 for Tandem Nonstop VLX, TXP and II systems and a $2,000 initial license fee and a $75 monthly charge for Nonstop EXT, EXT10 and EXT25 systems.

Optional Wordlink-Wang and Wordlink-DCA and Wordlink-Multimate translators carry a $4,000 initial license fee and a $150 monthly charge for Nonstop VLX, TXP and II systems; and a $2,000 initial license fee and $75 monthly charge for Nonstop EXT systems.

Multilan and Wordlink products will be available in March 1987.



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AT&T to sell supplier link

From page 29

The manufacturer can choose not to be identified in the file.

Suppliers on the manufacturer's preferred vendor list are then notified of the RFP via electronic mailboxes in Cad Cam's system. They can call up the listing and view, rotate and zoom the engineering drawings on a personal computer. Hard copies of graphics and text can be printed locally for further review.

Suppliers' quotes are transmitted via AT&T lines to the Cad Cam system, where they are processed and prioritized according to predefined parameters such as cost, past responses to bids and territory, Falter explained.

WSSDOM is based on Telegraphics, a 3-year-old Cad Cam-AT&T venture that enables users to access design data bases residing on Cad Cam computers. Telegraphics supports several standard graphics formats, including Initial Graphics Exchange Standard, Intergraph Corp., McDonnell Douglas Automation Co. and Computervision Corp. Companies without CAD/CAM systems can use a scanner from Medigraphics to digitize hard copy drawings and send them to the Cad Cam data base.

Selling the concept

The WSSDOM concept initially must be sold to manufacturers "with a critical number of suppliers," Falter said. Once a manufacturer signs on, AT&T's joint sales force would market the WSSDOM concept to suppliers that would respond to that manufacturer.

AT&T recently received permission from the Federal Communications Commission to mesh the Information Systems and Communications divisions' sales, marketing and customer support forces.

Customers will initially be connected to WSSDOM via AT&T WATS lines, Torrey said. Dedicated lines and packet-switching connections will probably be used in the future, he added.

WSSDOM availability is scheduled for the spring of 1987.

Ungermann-Bass links Ethernet, Token-Ring

Data Link Bridges broaden Net/One

By Elisabeth Horwitt

SAN FRANCISCO — Ungermann-Bass, Inc. has broadened its Net/One network-to-network connectivity line with Data Link Bridges that support a wide range of upper layer protocols, the vendor said.

The Data Link Bridges enable users on two different networks to exchange data and share resources. The introduction included two local bridges that connect physically adjacent local-area networks (LAN): the Ethernet-Ethernet Data Link Bridge and the Token-Ring-Ethernet Data Link Bridge. Both bridges can connect multiple networks through a common broadband backbone, Ungermann-Bass said.

Local bridges relieve network congestion by ignoring all locally addressed packets on a LAN and forwarding only those packets that are addressed to nodes on the other network, Ungermann-Bass said. This enables companies to divide an overburdened LAN into two networks, each of which supports a group of users that communicate most often with each other and only occasionally with the other group.

Ungermann-Bass also unveiled two remote bridges.

See **TOKEN-RING** page 33

Would your PC software

1. *Does your software include programs for easy access to mainframe information?*

2. *Can your spreadsheet consolidate additional spreadsheets then retrace your steps so auditors can find what they're looking for?*

3. *Can you draw 12 different kinds of graphs, size and position them, put them side by side (4 to a page if you need to) and preview before printing?*

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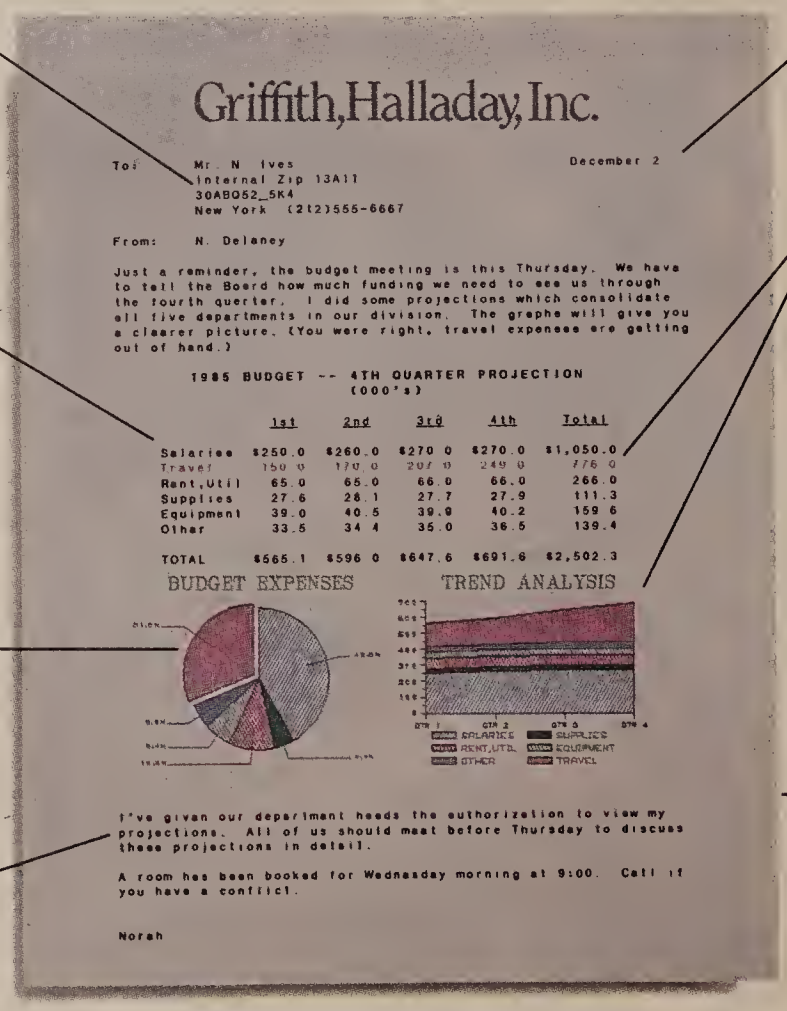

5. *Can you link a series of commands that will automatically update and assemble comprehensive reports month after month?*

6. *Can you personalize your document by redesigning the layout, or the look of the type, and adding color?*

7. *Can you access a mainframe, store and organize information with a database manager...*

...analyze it with an auditable financial model or spreadsheet...

...present your numbers in lots of different kinds of charts and graphs...

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Bridge over Token-Ring

From page 29

ports a range of third-party terminal emulation programs, including Hewlett-Packard Co. HP 2392 and 2623 emulation from Walker Richer & Quinn, Inc.; Tektronix, Inc. 4105 emulation from Grafpoint; and Data General Corp. Dasher 210 emulation from Performance Consulting Group.

Tokenterm competes directly with a similar introduction that Ungermann-Bass, Inc. made at Localnet [CW, Nov. 17]. "Bridge and Ungermann-Bass are pretty much head to head, although Ungermann-Bass emphasizes direct sales, and Bridge concentrates on OEMs," Terrie said.

Priced at $300, Tokenterm is available 30 days after receipt of order.

Token-Ring Ethernet link

From page 32

The Ethernet Remote Data Link Bridge links an Ethernet or broadband network to a remote Token-Ring, Ethernet or broadband LAN.

The Token-Ring Remote Data Link Bridge connects a Token-Ring network to a remote Token-Ring, Ethernet or broadband LAN.

Data Link bridges provide faster communications than bridges that operate at higher level protocols, Ungermann-Bass said. The Ethernet-Ethernet Data-Link Bridge can forward up to 6K packets per second, matching the speed of an Ethernet LAN, the company added.

Both remote bridges handle data rates of between 4.8K and 2M bit/sec. They support RS-232, AT&T 306/V.35 and RS-449 interfaces.

Because they provide connections at the data-link layer of the International Standards Organization's Open Systems Interconnect (OSI) model, all the bridges transparently support a variety of high-level communications protocols, including Transmission Control Protocol/Internet Protocol (TCP/IP), Digital Equipment Corp.'s Decnet, OSI protocols and Xerox Corp.'s Xerox Networking System.

Ethernet-Ethernet connections "have the added advantage of allowing multiple vendors' equipment running different upper-layer protocols to be linked over a single internetwork device," said Darrell Miller, Ungermann-Bass director of product marketing.

For example, the same Ethernet-Ethernet bridge can handle communications between DEC VAXs and IBM Personal Computers running Decnet as well as between AT&T Unix System V systems running TCP/IP.

Bridges that link a Token-Ring network with another LAN can handle only one type of upper level protocol, Miller added.

Both the local and remote Ethernet-Ethernet Bridges will be available in the first quarter of 1987. Token-Ring-Ethernet and Token-Ring Remote Data Link bridges will be available in the second quarter of 1987.

Baseband versions of the local bridges are priced at $9,495, and broadband versions cost $10,095. The Token-Ring Remote Bridge and the baseband version of the Ethernet Remote Bridge are priced at $9,495. The broadband Ethernet remote model costs $10,095. Software for each model costs $2,000.

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MICROCOMPUTERS

MICRO BITS
William Zachmann

A spreadsheet for all reasons

Lotus Development Corp.'s 1-2-3 so successfully established itself as a standard for spreadsheet processing that even the firm's own Symphony made limited progress in displacing 1-2-3.

In fact, the standard set by 1-2-3 was so effective many 1-2-3 users have stayed with the earlier Release 1A instead of converting to the current 2.0 version.

One of the more interesting events in the past year or so has been the appearance of a growing number of 1-2-3 Release 1A-compatible products.

A system with quite a lot to offer users is Lifetree Software, Inc.'s Words & Figures. Completely compatible with 1-2-3 Release 1A, Words & Figures includes many of the capabilities of 1-2-3 Release 2.0.

What most distinguishes the package, however, is the inclusion of a quite reasonable medium-function word processor.

Lifetree's major product prior to Words & Figures has been Volkswriter, a fully featured word processing program. The word processing in Words & Figures is quite separate from Volkswriter's and does not contain all the features of Volkswriter and other dedicated word processing packages.

It does, however, provide all the basic capabilities that most business users will require and, most important, makes it easy to combine spreadsheet data into documents.

Lifetree is quite justified in billing Words & Figures as "the spreadsheet for people who want to write about their numbers."

Spreadsheet cells can be directly inserted in text created with the Words &

See **SPREADSHEET** page 36

Zachmann is vice-president of research at International Data Corp.

Tool widens MS-DOS uses

Offers MC68000-based systems compatibility

By David Bright

LAS VEGAS — Phoenix Technologies, Ltd. recently announced a software emulation product for running Microsoft Corp. MS-DOS on Motorola, Inc. MC68000-based systems and other non-IBM Personal Computer-compatible systems.

Speaking at Comdex/Fall '86, Rich Levandov, vice-president of strategic operations, said that manufacturers could begin offering the Soft Coprocessor for their systems by March or April. Phoenix will begin shipments to OEMs sometime in the first quarter of 1987. Phoenix said it hopes that manufacturers of 68000-based products, such as Apollo Computer, Inc., Hewlett-Packard Co. and Sun Microsystems, Inc., will use the product to add MS-DOS compatibility to their workstations and systems without additional hardware.

"The goal is complete PC compatibility on any other computer that sells for below $50,000," Levandov said. "It's the universal workstation coming into being."

One problem that the product may have is slow performance, but Phoenix is intending the product for occasional IBM PC applications users. Levandov said the applications should be able to run nearly as fast as they would on a basic IBM PC.

According to Phoenix, the Soft Coprocessor provides a complete IBM PC XT-compatible environment supporting all existing I/O controllers. In systems containing the required floppy disk drive controllers, the software supports all IBM PC applications; in systems without floppy disk hardware, it supports most copy-protected and all unprotected software.

The Soft Coprocessor is an extension of Phoenix's coprocessor product line, which utilizes a combination of board-level hardware and communications and emulation software to integrate IBM PC-compatibility to incompatible systems. The Soft Coprocessor is said to include emulation software that remaps the Intel Corp. processor instruction set to the host system's native processor.

Oracle brings SQL to casual user

By Douglas Barney

LAS VEGAS — In an attempt to bring SQL to the masses, Oracle Corp. unveiled EasySQL, an end-user interface for the firm's Oracle data base product line.

Although EasySQL does not provide a full implementation of SQL, it provides much of the functionality of a fuller featured, but more difficult to use, SQL interface. "We have selectively made portions of SQL accessible to the naive user," said Eugene Shklar, director of marketing for Oracle's PC product line. "It takes advantage of some of the functionality that is built into the SQL language."

Oracle is aiming the product at novice and casual users of its data base products. Many of these users infrequently query data bases, and may have difficulty learning and retaining knowledge of SQL procedures. "Training does not do a whole lot of good because of infrequent use," said Kenneth I. Cohen, director of product marketing for Oracle. "We are trying to create autonomous casual users of the system," Cohen said.

The system provides ad hoc relational queries, as well as data base table creation and maintenance, color graphics and report writing. The system also uses a fill-in-the-blanks technique for data entry and updates. EasySQL also allows users to access other Oracle programs, such as SQLCalc, an Oracle spreadsheet program.

According to the firm, EasySQL achieves ease of use through pop-up windows and point-and-select techniques. The system provides automatic hints and context-sensitive Help.

EasySQL will ship next month and will initially be available on IBM Personal Computers and compatibles as well as on Digital Equipment Corp.'s VAX minicomputers and Microvax line. Next year the product will be available on other micros, minis and mainframes.

EasySQL sells for $395 as an add-on and will cost $995 when sold with the Oracle data base that runs on IBM PCs and compatibles. On DEC's VAX line, the product will cost from $1,000 to $18,000.

There are currently some 15,000 licenses for Oracle on PCs, company officials said.

Quadram graphics board offers more than IBM's EGA

Product based on Intel's 82786

By David Bright

LAS VEGAS — Quadram Corp. recently announced an IBM Personal Computer XT-compatible high-performance graphics board — one of the first boards based on Intel Corp.'s 82786 graphics coprocessor.

The board was presented at Intel's 80386 and 82786 product showcase at Comdex/Fall '86. Called QuadHPG, the card reportedly provides twice the resolution, 16 times the color selection and up to 100 times the speed of IBM's Enhanced Graphics Adapter (EGA), a now standard board introduced two years ago.

According to James Rush, Quadram Graphics Products Division manager, the board transforms an IBM PC XT or AT system into a true graphics workstation.

Four resolution modes

The QuadHPG supports four resolution modes: 640 pixels by 200 pixels (IBM Color Graphics Adapter); 640 pixels by 350 pixels (EGA); 640 pixels by 480 pixels (Professional Graphics Controller); and 640 pixels by 480 pixels for RS-170A red-green-blue display, according to the company.

The board can display up to 256 colors from a palette of more than 16 million colors. A drawing rate of 2.5 million pixel/sec. enables the board to display up to 25,000 char./sec. It has an area fill rate reaching 3.75 million pixel/sec.

For display refresh, character fonts and display listing, the board carries between 512K bytes and 2M bytes of standard dynamic random-access memory. It supports both analog and digital data output and is compatible with either an 8-bit or 16-bit data bus interface. The board's analog resolution is 1,280 by 960 pixels, according to the company.

Pricing has not been set. Delivery will begin in early 1987, Quadram said.

Other new 82786 products at the showcase were a graphics card under development by Number Nine Computer Corp. and a workstation from MAD Intelligent Systems, Inc.

MAD's D3000 system for bridging artificial intelligence and data processing environments includes both the 82786 graphics coprocessor as well as Intel's 32-bit 80386 microprocessor.

INSIDE

Plus enhances Hardcards to run on 80286-based systems/**38**

Speech Systems develops micro-based phonetic engine/**38**

Intellisoft rolls out power-loss prevention tool/**38**

NEW THIS WEEK

- Dynapro Systems offers the Chronos operating system for the IBM PC XT and AT

■ For more on this and other new products, see pp. 69-76.

INSTANT ANALYSIS

"IBM isn't here to say anything about Topview or what, if anything, they're going to make proprietary."

— Stephen Hysick, applications engineer for Acco Babcock, Inc. and Comdex/Fall '86 attendee, on the lack of information on IBM's future Personal Computer strategy

A spreadsheet for all reasons

From page 35

Figure word processor and are live.

That is, if you go back and make modifications to the original spreadsheet, those changes are automatically reflected in the cells that are included in the document.

Writing a memo on a business plan with the figures included in the text is easily and conveniently done.

The split screen capability of Words & Figures lets you work with a document and the spreadsheet at the same time. Switching back and forth between the two is handled with a simple function key switch.

Integrating spreadsheets

This greatly simplifies the process of integrating portions of a spreadsheet with text.

Words & Figures has a lot of handy spreadsheet features as well.

Like Lotus's 1-2-3 Release 2.0, Words & Figures includes an Intel 8087 math coprocessor and expanded memory support. It also uses a sparse matrix technique for handling spreadsheets in memory.

The last feature makes it possible to handle much bigger spreadsheets than would otherwise be feasible.

Both the IBM Enhanced Graphics Adapter (and compatibles) as well as the Hercules Computer Technology, Inc. monochrome graphics specification are supported.

A spreadsheet audit capability is also included.

Detection of errors

The audit capability will detect possible circular references and identify the sources of Error and Not Available results, which can be a handy feature in working with complex spreadsheets.

In addition, Words & Figures contains graphics output capabilities that represent a significant enhancement of those in the Lotus 1-2-3.

The software supports a large selection of printers. In addition, the Words & Figures Picprint program provides 13 different type fonts and supports Postscript printers, resulting in more options for producing attractive graphics output.

All of this, of course, works perfectly well with existing Lotus 1-2-3 Release 1A spreadsheet files.

Words & Figures's word processing capabilities and spreadsheet enhancements thereby become available for use with data already in hand for the typical 1-2-3 user.

A minor feature that I particularly appreciate is a built-in cursor key accelerator.

> ***"Lifetree is quite justified in billing Words & Figures as "the spreadsheet for people who want to write about their numbers."***

When you hold down one of the cursor control keys, the cursor movements speed up if you continue to hold the key down.

Although this may seem like a minor point, it is a welcome feature in practice.

Perhaps best of all, however, is that Words & Figures is not copy protected.

As far as I am concerned, the program is worth having just for the benefit of doing away with the stupid and annoying inconvenience of having to use a key disk to start the program.

I don't know about you, but I strongly resent having silly and unnecessary tasks imposed upon me for the protection of the software vendors.

All things considered, Words & Figures is a nicely designed program that offers a lot of value for the price. At $195, Words & Figures is well below the $495 price ticket on Lotus's 1-2-3 Release 2.0, and it is equal or ahead in most spreadsheet features.

So, even without the word processing capability it would be a reasonable alternative.

With that, Words & Figures looks like a terrific value for users and may, in fact, give the Lotus 1-2-3 a serious challenge.

In addition, Lifetree offers site-licensing options for businesses.

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New Dimensions in Software Productivity.

Plus enhances Hardcards to run on Intel 80286 systems

Programmable ROM BIOS chip included

By Peggy Watt

MILPITAS, Calif. — Plus Development Corp. recently announced an upgrade kit to enable its Hardcard 20 hard disk on a card to run on Intel Corp. 80286-based systems.

The 20M-byte Hardcard was previously unable to interact with the BIOS of IBM Personal Computer AT-class machines and could run only on Intel 8088- or 8086-based systems, said Wayne Erickson, Plus Development product manager. The $50 80286 Upgrade Kit, however, includes a BIOS programmable read-only memory chip to ensure compatibility and provide hooks to the AT-compatible operating environment, he said.

Similar products from other vendors that put hard-disk technology on expansion cards are currently available only for 8088- and 8086-based systems.

According to Plus Development, installation is relatively straightforward, with the Hardcard user first removing the existing BIOS chip from the card with a tool included with the kit.

The kit also includes a software program to be run once to change the Hardcard's BIOS interactions.

"It's really a software change, so the upgraded card will work in both the 8088/86 and 80286 environments," Erickson said. The upgrade will be available in mid-December.

Several users said they have been waiting for Hardcard support of 80286 systems. John Molloy, manager of data center operations for Hibernia Bank in San Francisco and a beta-tester of the original Hardcard, said he has been asking for a Hardcard that would run on his department's half-dozen PC ATs.

"Since the Plus Hardcard only takes up one slot [on the motherboard], we can easily add it if we run out of capacity on an internal hard disk," he said. He originally installed Hardcards on an IBM PC and two Compaq Computer Corp. Portables and said the 80286 support is "something I think we'd be interested in."

Joe Rogers, finance and administration department manager for Quantum Software Systems, Inc., which owns Plus Development, called the Hardcard "a much more elegant solution" for expanding the capability of his PC AT systems.

Plus's Erickson said the upgraded Plus Hardcard will run on the IBM PC AT and 286 XT, Compaq's Portable II and Deskpro 286 and will also work on some clones. A version to accommodate the recently released 80386-based Deskpro 386 is in the works, as is a 30M-byte Hardcard, he said.

The 80286 Upgrade Kit will be sold separately from the Hardcard 20, which is priced at $895, as an option for 80286-based system users.

Speech Systems announces speech-to-text conversion tool

Phonetic engine for OEMs, end users

By Peggy Watt

TARZANA, Calif. — Tools for smooth speech-to-text conversion were announced recently by Speech Systems, Inc., which has developed a microcomputer-based phonetic engine for both OEMs and end users.

The development version of the engine, the DS100, is currently available with a lower cost end-user version, the PE200, to be released next spring, according to Bill Adams, Speech Systems vice-president of sales.

Both products take an approach different from other speech recognition tools by recognizing not words but phonetic sounds and parts of words, Adams said. Their developers say the products ensure wider use of the speech tools as users will not have to "read in" and define any voice commands in advance or pause unnaturally during speech input.

Speech Systems developers say the phonetic engine offers an alternative for any input-heavy task, from simple data entry to data base applications or word processing when both hands are busy. "Why would you want to type it when you could talk it?" Adams asked.

Telephone data entry

Adams also said the company has received queries from clients who want to practice data entry or retrieval over the telephone.

Defense contractors and the military have expressed interest in the technology for alternate input systems for pilots or on-line voice commands, Adams added.

Speech Systems phonetic engines come with 20,000-word phonetic dictionaries. According to Speech Systems, the end-user model will be packaged as a speech input peripheral that attaches to the side of an IBM Personal Computer or compatible microcomputer, with a telephone-like handset.

Input translation

Speech input is transmitted to the computer through an RS-232 cable. The hardware includes the Phonetic Decoder software, which translates the spoken input to text on the screen. Package price will be $5,000, with volume prices available, Adams said.

The development model phonetic engine, the DS100, is packaged in a microcomputer chassis with Phonetic Engine attached, plus Phonetic Decoder software, at a cost of $52,000, which includes development documentation and a license to produce and sell Speech Systems runtime software.

Although Adams said the products are aimed at value-added resellers and OEMs that will assemble packages with voice input available for vertical applications, Adams expects some large DP shops will also do their own development and tailor the speech input systems to their own tasks.

The initial speech-to-text translation is into ASCII. "This is application-dependent," Adams noted. The product could also run on networked applications, he added.

Although the first version of the Phonetic Decoder is designed for IBM PC and compatible systems, Adams said he expects it will be ported to a variety of systems in the future, from high-end workstations to possibly Apple Computer, Inc.'s Macintosh.

Speech Systems has been developing its speech-to-text tools for five years and now employs approximately 70 workers.

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Intellisoft product protects data during power failures

NOVATO, Calif. — A product that protects data during power loss was recently announced by Intellisoft, Inc.

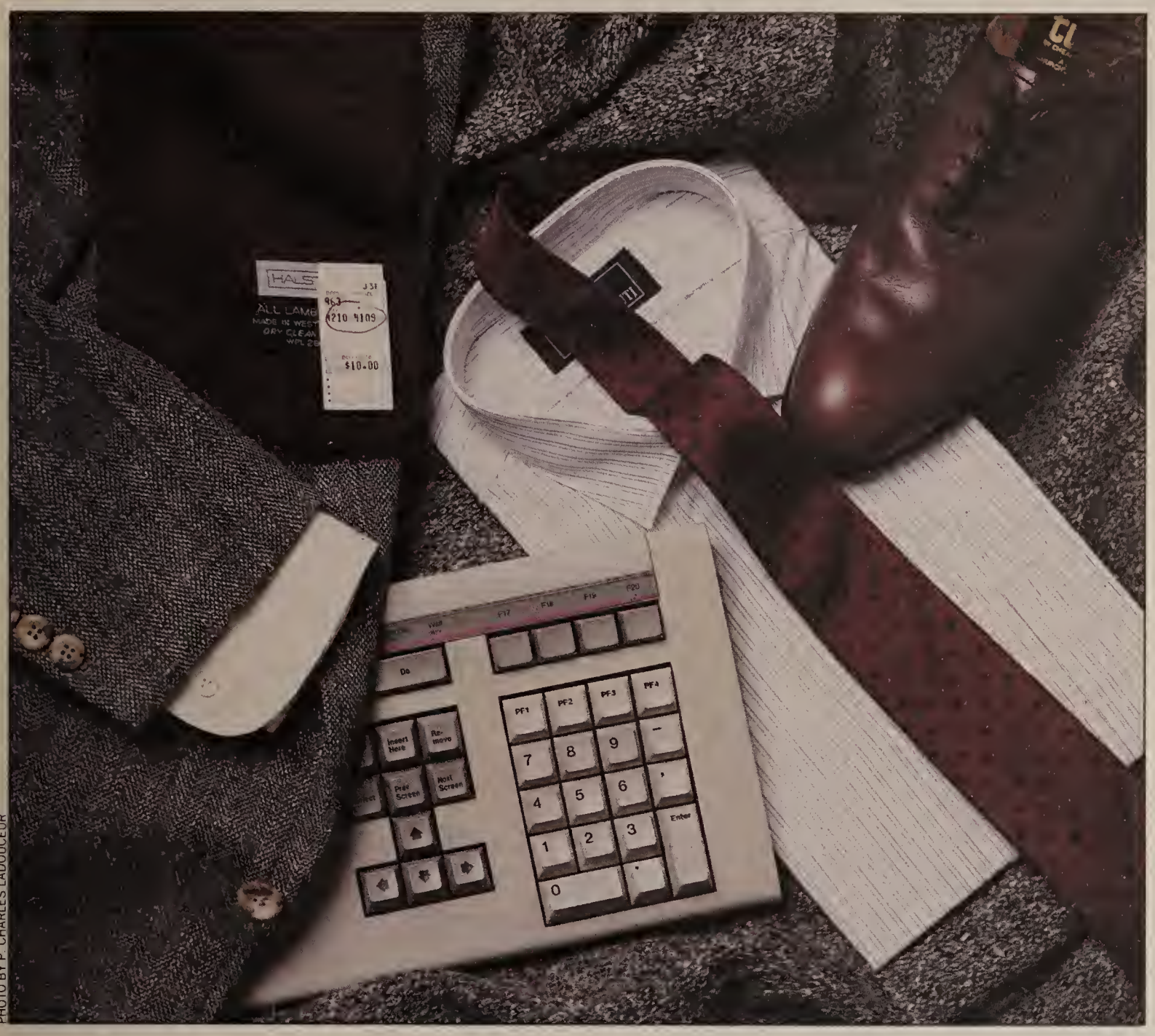
The $69 package, called Bookmark, is memory resident, automatically records data from random-access memory and saves the data to the user's hard disk. Users can determine how much data the system should save either by number of keystrokes or length of time.

According to the firm, the user can resume work shortly after a power failure, power down or an accidental restart without loss of data. In addition, a user can power down and upon restart return to the point at which he left off. The firm said that the product eliminates the need for a battery backup and operates faster than conventional reloading.

With the Auto-Resume function, a program that is run overnight can be protected against data loss and automatically restarted.

The package runs on an IBM Personal Computer or compatible with at least 64K bytes of random-access memory and a hard disk.

Executive Report



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Computers in retailing:

Shopping for strategic advantage

By GLENN RIFKIN

For America's shoppers, the change is subtle. Over the past decade, shopping in retail outlets appears to have changed little. Sure, the odd, striped decoration (known as the Universal Product Code) has become commonplace on items in supermarkets, and the old whizzing and banging cash register has gone the way of the dinosaurs. Receipts, if anyone bothers to look at them, now provide a bundle of information that was heretofore impossible to squeeze onto such thin rolls of paper.

And cashiers no longer leaf through countless Mastercard or Visa numbers hoping to spot yours as the delinquent one. They simply slip the card through a magic telephone and punch in a few numbers; within seconds your good name is cleared, and the item is in the bag.

But shopping as an experience hasn't changed all that much. Frenzied bargain hunters still claw through the racks, wanted items are still out of stock, lines at the checkout counter still crawl along. Unobservant shoppers would not notice the impact of computers on the retail business at all.

Rifkin is a Computerworld *senior editor.*

If anything, they might be annoyed that the cashier now must punch dozens of numbers into the electronic cash register for every item, thus making the checkout lines even slower than in the old days.

Nonetheless, technology has changed the face of retailing dramatically, particularly among large retailers. A huge and varied industry, there are more than two million retail establishments in the U.S. of every shape and form, from general merchandise stores to eating and drinking places. The annual take for this multidimensional industry exceeds $1 trillion.

As computers have downsized, retail chains have begun to put more horsepower into individual stores and into the hands of the end users running those stores.

Many of the large retailers, such as Sears, Roebuck and Co. and J. C. Penney Co., embraced technology more than 25 years ago and have steadily increased their commitment to computers. As computers have been downsized, retail chains have begun to put more horsepower into individual stores and into the hands of the end users running those stores.

Though small and medium-size retailers are only now looking to technology, analysts believe that market holds vast potential for computer

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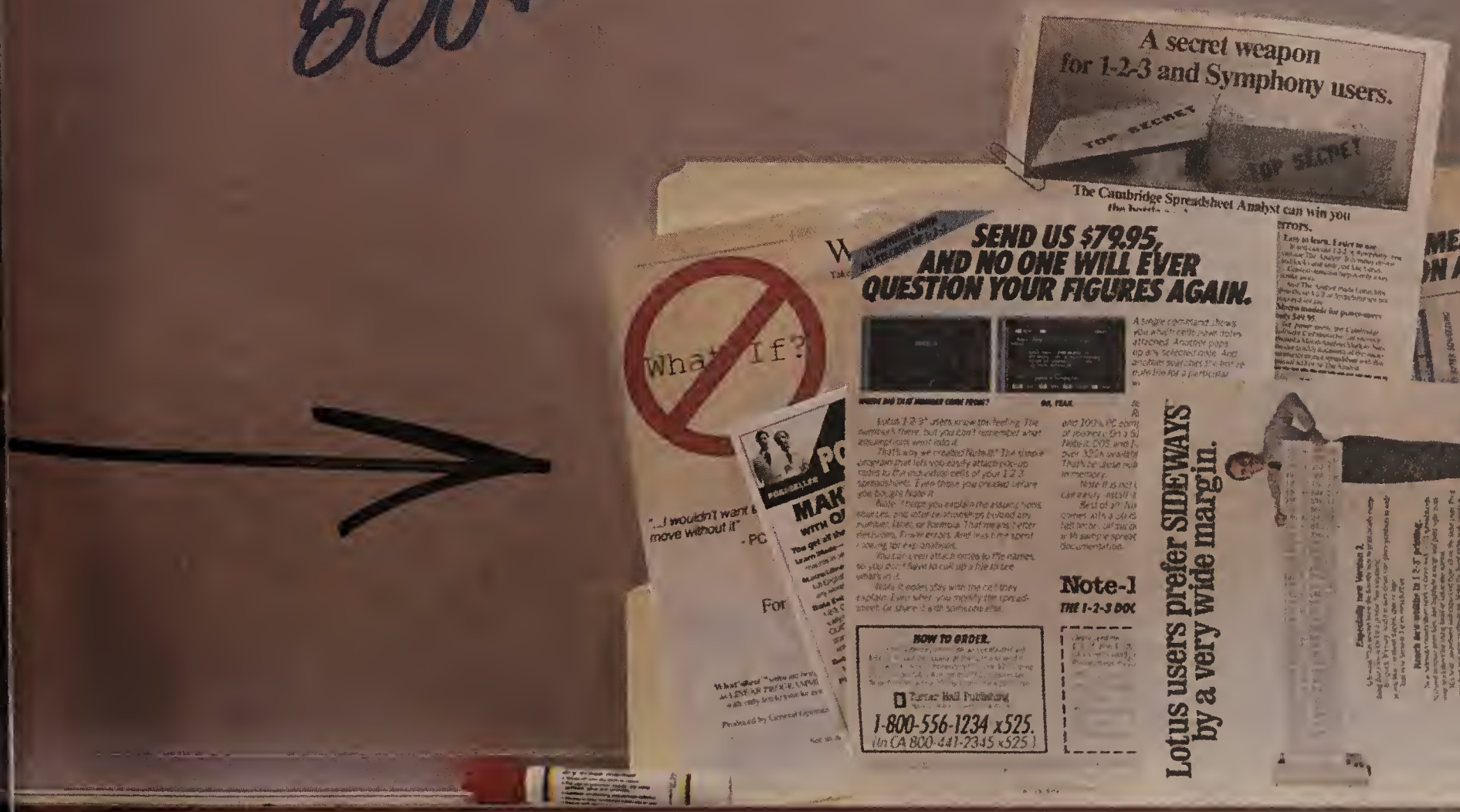

Shopping for strategic advantage

Continued from previous page
vendors to peddle their wares.

For this untapped marketplace, a meeting of the minds between vendors and users is necessary before significant automation takes place on a smaller level. As specialty stores grow in popularity, specialty systems and software are needed to convince owners that automation adds to the bottom line. Both sides can take lessons from what has occurred among the large retailers.

As Herbert Kleinberger, director of retail systems consulting with Management Horizons, Inc. in New York, points out, the systems being used in retail have evolved from simple accounting applications aimed at basic transaction processing to operational systems aimed mainly at planning and control activities and finally into merchandizing applications geared toward tracking and managing the buying and inventory management functions.

TWENTY-FIVE LARGEST U.S. RETAILERS*, INSTALLED BASE OF COMPUTER SYSTEMS

	Sites	Systems	Estimated Value (Millions of Dollars)
Sears, Roebuck & Co.	49	132	270.2
K-Mart Corp.	8	25	47.8
Safeway Stores, Inc.	17	40	37.8
Kroger Co.	19	33	22.6
J. C. Penney Co.	16	54	149.8
American Stores	13	35	48.7
Southland Corp.	3	6	16.4
Federated Department Stores	18	64	99.2
Lucky Stores	7	23	20.6
Household International	16	74	93.8
Dayton-Hudson Corp.	7	26	47.6
Winn-Dixie Stores	8	14	4.3
Wal-Mart Stores	1	3	13.3
Montgomery Ward & Co.	7	26	25.5
F. W. Woolworth Co.	9	31	26.4
Batus, Inc.	12	53	34.4
Great Atlantic & Pacific Tea Co.	3	7	16.9
May Department Stores	12	34	15.0
Albertson's, Inc.	2	3	7.8
Melville Corp.	10	32	23.9
Supermarkets General	3	11	11.1
Associated Dry Goods	7	20	9.6
R. H. Macy & Co.	4	15	10.6
Allied Stores Corp.	23	65	25.0
Carter Hawley Hale Stores	9	63	32.3
TOTAL	**283**	**889**	**1,110.6**

* Rank based on "Fortune Directory, June 1985."

Information provided by International Data Corp.

The function of computers, according to Kleinberger, has shifted away from simply handling routine tasks. He says their use is shifting toward decision-support activities that are aimed at providing management assistance with critical decisions.

Though it is a catchphrase heard throughout industry, the term "strategic" or "competitive" advantage is now being trumpeted for the first time throughout the retail industry. Information systems, from point-of-sale (POS) terminals on the store floor to expert systems running on superminis, are being called upon to help Macy's beat Gimbel's.

At Sears, which opened its first data center in 1962, Charles Carlson, vice-president of information systems, says, "Hardly a portion of our business, either in the field or in the headquarters organization, is not impacted by information systems."

The numbers reflect that. According to market research firm International Data Corp. (IDC), the retail automation market will be valued at nearly $11 billion by 1988, double that of 1984, with an annual growth rate of 18.8%. And it is not just the large retailers that are looking toward technology.

Jim Larson, an independent retailing consultant based in Evanston, Ill., is urging his smaller clients to consider automation. "A single store, once it gets to over $1 million in sales, needs to consider getting computerized quickly," Larson says. "They need to get on top of it because the margins in retail are low, and they need to wring every dollar out of their investment. And the competition is getting rough out there."

Despite his warnings, Larson says he believes that small retail operations, $50 million and less, are still woefully unprepared for the age of technology. He sees computers doing back room functions, such as general ledger or accounts payable, in these businesses but little movement toward retail automation.

"No other industry with companies that large do as little as they do," Larson states. "They manage by eyesight or instinct. Some do very well that way. Some don't trust automation. They tried it years ago and got burned. The vendors sometimes promised things they didn't deliver."

Industry analysts agree that automating the retail environment is more difficult than automating other industries. "The major difference in data processing in retailing than in other industries is the large number of small-value transactions," explains Robert Zimmerman, retail industry consultant for Coopers & Lybrand in New York. "Instead of selling airplanes for $1 million each, you are selling handkerchiefs for $1 apiece. This creates enormous problems for retailers. They can capture the information, but once they've got it, how do they use it?"

That question is being asked industrywide by chief executive officers. MIS managers credit the profusion of POS terminals in the stores as the catalyst for CEO involvement. As merchandising specialists, these industry leaders knew or cared little for the back room mysteries of the host system.

But when they saw the value of the POS on the selling floor — a place they felt comfortable — and then saw the link from POS to that host computer and what the possibilities were in relation to the bottom line, interest soared.

At Zayre Corp. in Framingham, Mass., Michael Bilotti serves as senior vice-president and director of corporate information systems. Bilotti says the company, which owns more than 1,000 Zayre, T. J. Maxx and Hit or Miss outlets, has long believed in the ability of systems to make it easier to serve the customer.

"The objective is simple," Bilotti says. "We want to make our stores a better place to shop. We want to help get the customers through the store, have the merchandise they want in stock and get them through the checkout as fast as possible. You have to stay a step of ahead of everyone else, and with new and better systems, you can gain a strategic advantage."

Retail demands on MIS are growing

For MIS in retailing, the demands are increasing and spreading further away from the central headquarters. Though most large retailers retain a centralized host-based attitude, MIS is seeing demands on the rise from individual stores and outlets. Merchandisers, realizing the value of information on the spot, are no longer willing to

Continued on page 47

Large, small stores seek high-tech edge

Give or take $280 million worth of systems responsibility, Charles Carlson and Art Freeman have strikingly similar missions in life. Both Carlson, vice-president of information systems and data processing for Sears, Roebuck and Co., and Freeman, controller of the Parkleigh Pharmacy in Rochester, N.Y., are using computers in a reach for competitive advantage in the dog-eat-dog world of retailing.

While Sears, the $40 billion Chicago-based retailing giant, embraced technology in a big way more than 20 years ago, Freeman's Parkleigh store, a $3 million speciality and gift shop, is a more recent convert to the wonders of computerization. Freeman brought in his IBM system just four years ago. Nonetheless, both Carlson and Freeman are now zealots in their endorsement of information systems.

Sears' Carlson

At Sears, Carlson oversees a nationwide network of systems for the Sears Merchandise Group. A 31-year Sears veteran — the last 20 in information systems — Carlson has watched the company's early commitment to computing grow to where he literally cannot name all the systems in place. It is estimated that the nation's largest retailer operates nearly 150 different systems — from point-of-sale (POS) to inventory management to distribution to front office automation — at a cost of more than $300 million.

"There is hardly a portion of the business, either in the field or in the headquarters organization, that is not impacted to a degree by information systems," Carlson claims.

In Rochester, Freeman sees a similar dependency. Using a 5-year-old IBM System/23 Datamaster, a little-known stand-alone desktop business computer, Freeman runs virtually every aspect of the store's business — from inventory control to general ledger to merchandise and sales analysis.

"I went this way in the first place because I was lazy, and the system saves me a lot of work," Freeman says. "But now I don't see any other way to run the operation. We really got stonewalled with paperwork, and the system cut that down. It also eliminated the tedium of planning and buying."

For retailers of all sizes, from behemoths like Sears to one-store operations like Parkleigh, the use of computers has spawned a new level of awareness of business opportunities. From the basic back room accounting needs, information systems are now playing a significant role in the search for competitive advantage.

Carlson explains that Sears has never shied away from the potential of technology to build

Continued on page 44

PHOTO COURTESY OF GANNETT NEWSPAPERS

Parkleigh's Freeman

Even if something inside it stops, it goes.

In the past, if you needed a fault-tolerant computer, you had to make certain sacrifices.

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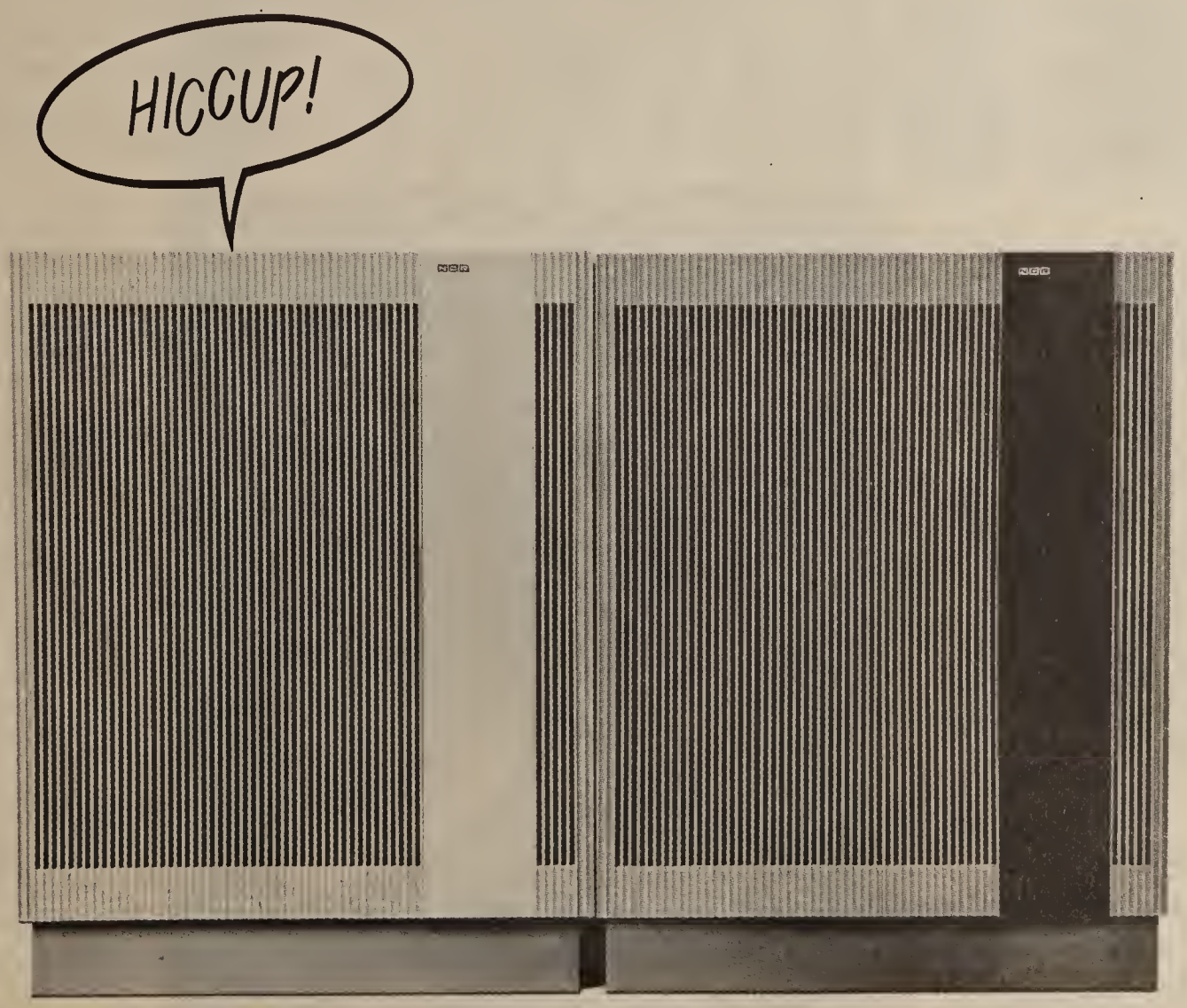

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Continued from page 42

the business.

In 1970, for example, Sears was the first major retailer to install electronic POS systems throughout its stores for data capture in inventory management.

The company, in fact, is already on its second-generation POS system. "We were the first major retailer to have full price lookup from the POS for both regular and promotional goods," Carlson adds. "And we've been communicating electronically with some of our major suppliers for nearly 20 years."

Carlson points out that Sears has more than 2,000 IBM Series 1 minicomputers serving as gateways to a nationwide distributed network that reaches down to every store and outlet.

Via this sophisticated network, Sears handles inventory tracking and planning, and Carlson is stepping up efforts to improve Sears' just-in-time inventory approach in order to get merchandise into the stores faster.

> ***"For retailers of all sizes, the use of computers has spawned a new level of awareness of business opportunities. From the basic back room accounting needs, information systems are now playing a significant role in the search for competitive advantage."***

More important, Carlson wants his systems to focus on the improvement of customer service.

"A major focus of everything we do in systems is to make sure we have a customer-service orientation — that we don't develop systems that impede our ability to serve the customer," he says.

Carlson describes a new catalog pickup system as an example. Using touch-screen terminals, Sears catalog customers can look up an item, order it, receive a ticket telling them where the order is, pick up the item and get checked out of the store in a minimal amount of time.

Though Carlson is proud of Sears' commitment to computers — "I believe we have the largest and most effective data gathering capability in retail" — he acknowledges that there is still much left to do.

"We can better utilize the information that we have to shorten lead times in getting goods to the stores and provide our merchants with more of what is selling and less of what isn't," Carlson reports.

That same type of information has made a dramatic impact on the Parkleigh store.

Freeman explains that the System/23, that was purchased along with all software and peripherals for less than $30,000, has brought Parkleigh's buyer into closer touch with both merchandise movement and planning.

He further claims that this closer relationship has led to a 50% increase in stock turns since the system was installed (a stock turn is the number of times inventory is turned into sales).

"Our suppliers have gotten a good education from the system," Freeman states. "They can't argue with the numbers. The computer is unyielding and completely objective. They still try to blame the computer every once in a while, but soon realize who is wrong."

Freeman adds that the computer has freed up the store's buyer to spend more time on creative planning and less time on paperwork.

Though he says he would not qualify his software as an expert system, Freeman insists that through trend analysis and sales analysis, the buyer can make better educated decisions on merchandise planning.

"Once you've got the historical data in the system, it can give you a sense of the trends and get you in the ballpark. When you're running 800 line items, the system is worth its weight in transistor chips," he says.

Freeman realizes that he is an anomaly among small retailers. Industry analysts point out that small to medium-size retailers have been slow to invest in technology.

"In general, the level of sophistication in retailers is lower than in any other business," says Jim Larson of Independent Retail Consultants in Evanston, Ill. "In the small range, retailers are very unsophisticated," he adds.

Freeman says he believes the key obstacle to technology in the small retail outlets is fear.

"I didn't know anything about computers, but I wasn't afraid of them either. A lot of retailers are simply afraid of computers. I had an innate desire to learn," he says.

"The system has given me confidence to see things clearly," he says. "It sort of pats us on the back. We'd not have gotten this far without the computer."

— GLENN RIFKIN

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Continued from page 44

wait for the corporate data center to turn around a requested application over a period of weeks.

At Zayre, Bilotti oversees the corporate data center, but each of the company's five divisions retains its own data center and development staff. "The different operations have different systems needs," he says simply.

Bilotti oversees all the individual operations and provides advice and expertise to each division on an as-needed basis. "I have an overview and expertise that they don't have," he points out. "I can generally negotiate better deals and coordinate corporate efforts."

But Bilotti says he believes strongly that the decentralized approach is imperative for his company. "The divisions can better define their own needs," he says.

The centralized vs. decentralized question tends to get answered by the nature of the particular business. Large conglomerates with several different retailers in the fold tend to let the individual subsidiaries run their own technology show. In the case of a single chain, even one as large as Sears, centralized control remains imperative.

"The larger chains tend to have a central buying organization, and this generally means centralized control of information systems," says Stewart Neill, vice-president of MIS for Saks Fifth Avenue in New York. "MIS has to know what the stores need. There is definitely a mood toward greater centralization in retailing."

Even with central control, the downsizing of equipment is acting as a catalyst for the distribution of systems throughout retail organizations. Sears, for example, has more than 2,000 IBM Series/1 computers spread throughout its chain.

According to a recent IDC report on retail automation, retailers are looking to give better data to the individual store manager and to offload data from the corporate mainframe.

"Corporatewide applications such as payroll and general ledger are still run on a large central mainframe, but many retail-specific applications like inventory management and price lookup are moving to smaller, in-store processors," the report reads.

Regardless of where control lies, the questions facing retailers tend to transcend questions of where the power is; they ask instead, What can the power do to help gain competitive advantage? Simply throwing more MIPS — or million instructions per second — into the operation can certainly help.

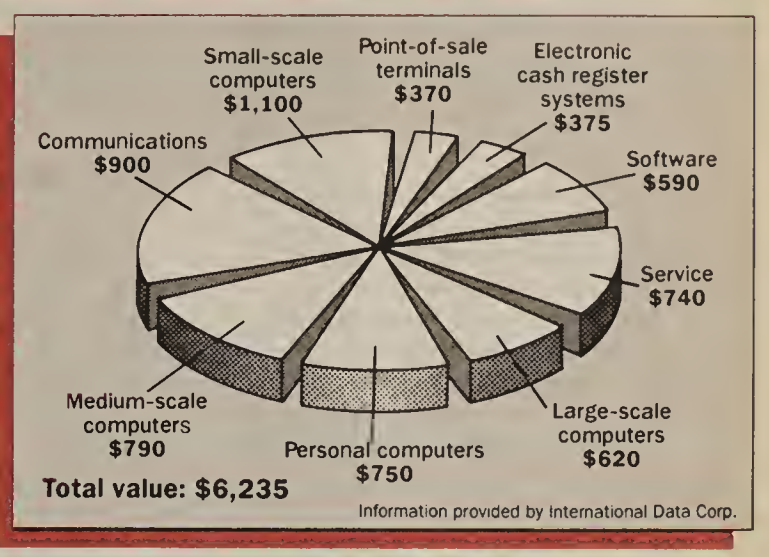
Zayre's Bilotti, for example, has long used IBM's Inform software package — an information forecasting and replenishment tool — on his corporate mainframe. Inform, however, is "such a cruncher of MIPS" that Bilotti could not effectively use the package until he took delivery of an IBM 3090 this year.

Retail MIS managers, however, are being pressed for more than just power. As in other industries, retailers are seeking ways to improve the bottom line through technology. The task is not simple; in many cases, it requires a complete change of attitude on management's part on ways to do business.

And MIS, steeped in its own traditions, must make a concerted effort to get involved in storefront thinking. In addition, retailing is more at the mercy of general economic ebbs and flows than most other industries, and when times get tough, CEOs tend to pull in the reins on systems. This, MIS believes,

JEFF BABINEAU

1985 U.S. RETAIL AUTOMATION MARKET (Millions of Dollars)

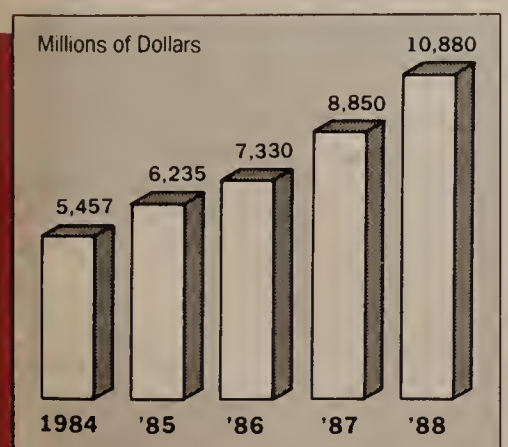


Total value: $6,235

Information provided by International Data Corp.

JEFF BABINEAU

U.S. RETAIL AUTOMATION MARKET, 1984-1988



Cumulative Annual Growth Rate 1984-1988: 18.8%

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is a major concern.

"It's always a hard sell to management," Bilotti declares. "The economy controls the environment, and spending is definitely not growing by leaps and bounds. But in this business, if you don't continue to develop, you cease to exist."

Innovative shops, such as Zayre, are trying various cross-cultural projects to better blend MIS and the merchandisers. For the past nine years, Zayre has run a Business Systems Interface Group, a liaison organization linking MIS to the user organizations.

People from systems as well as end users have served in the group, translating users' needs to MIS and the capabilities of MIS to users.

> ***'It's always a hard sell to management. The economy controls the environment, and spending is definitely not growing by leaps and bounds. But in this business, if you don't continue to develop, you cease to exist.'***
>
> — Michael Bilotti
> Zayre Corp.

In addition, Zayre has an information center concept with a twist. Merchandising people come to the information center and are trained on personal computers and high-level languages.

For a period of time, those people then work as programmers within their divisions. Finally, armed with expertise they could not have gotten elsewhere, they return to their merchandising jobs.

"The concepts have been very successful," Bilotti says. "They foster an understanding between MIS and the users."

Management Horizons' Kleinberger adds that additional relief may be on the way for beleaguered MIS execs in the form of software productivity tools.

Aimed at allowing DP to deliver faster and better systems solutions, these tools include fourth-generation programming languages, relational data base management systems, end-user computing tools for ad hoc inquiry and reporting and off-the-shelf packaged software.

Large retailers with well-staffed MIS departments can offer these solutions, but the medium-size and small retailers must rely on their own instincts and expertise.

This creates a danger that Larson cautions can turn a retailer off completely to automation.

He suggests that retailers seek professional advice about which off-the-shelf packages to incorporate into their businesses.

In addition, Larson predicts that 90% of all custom-designed systems fail despite expensive investments made by retailers seeking specific answers.

"Retailers should go to consultants and to shows such as those the National Retail Merchants Association puts on," Larson urges. "There are lots of good packages out there."

Coming to grips with technology

As the emphasis in information systems shifts from routine support functions to advanced decision support applications, retailers are coming to grips with the difficulties inherent in trying to meld business savvy with technology.

According to Kleinberger, the use of technology in retailing faces a series of challenges as the 1990s approach. He makes the following points:

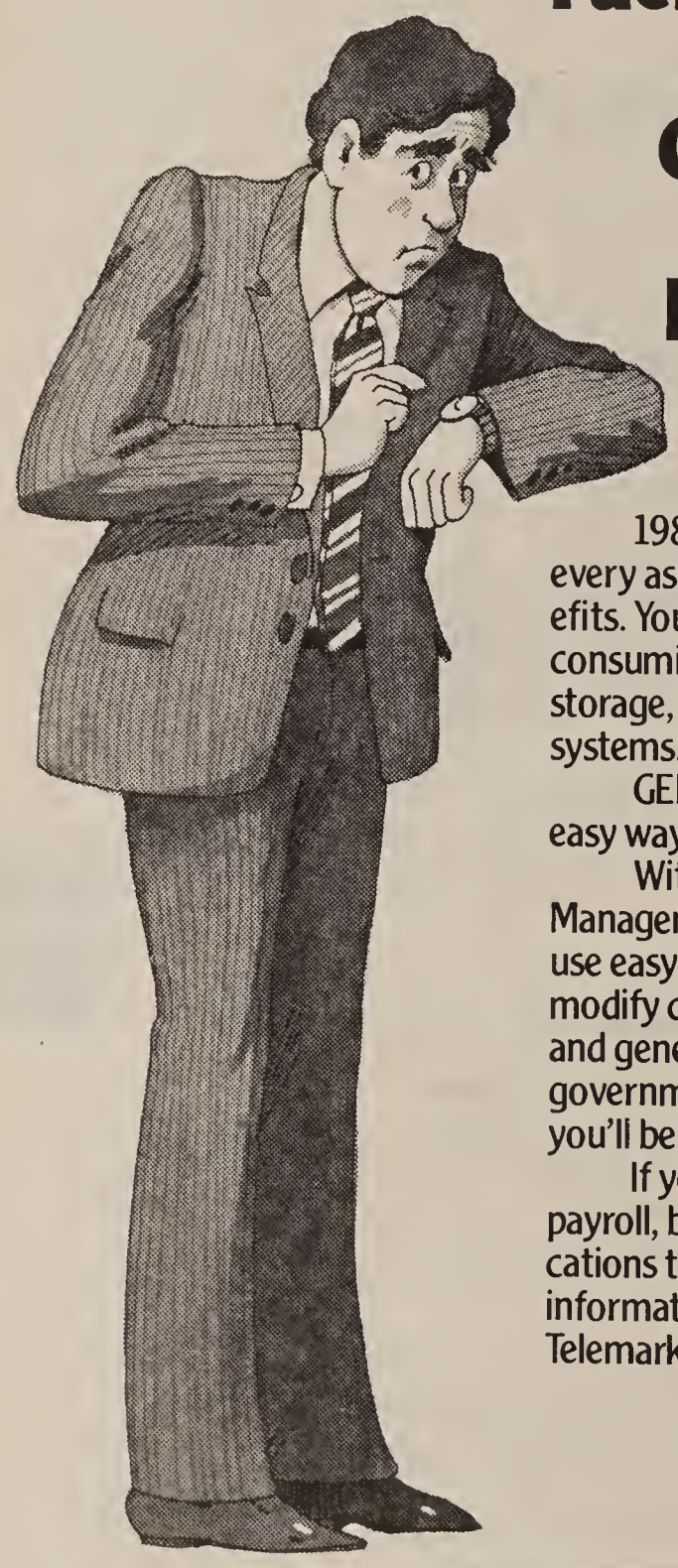
- The key users of technology and systems in the company are changing from middle management to senior management.
- As the key users move up the organization, the requirement for systems to be more flexible and responsive has become critical.
- With more opportunity for effective uses of technology now available, requests for systems development have significantly escalated, leading to a large backlog of unfilled requests at most companies.
- Further compounding the backlog problem is the huge investment in place in older technology and systems that traditionally have not permitted flexibility and generally restrict the ability of the MIS executive to respond to changes in the business needs.
- As a by-product of this problem, we are seeing DP personnel costs rising substantially as a percentage of total DP expenditures. Personnel costs now represent almost half of all DP expenditures.

Kleinberger also worries that a more serious problem lies ahead. He questions "the ability of the DP function to respond to the changing demands of the business."

MIS's ability to respond will ultimately depend on a mutual understanding between its own people and the merchandising specialists as to what is needed and what is reasonable to expect.

Some sophisticated tracking systems, for example, have already

Continued on page 51



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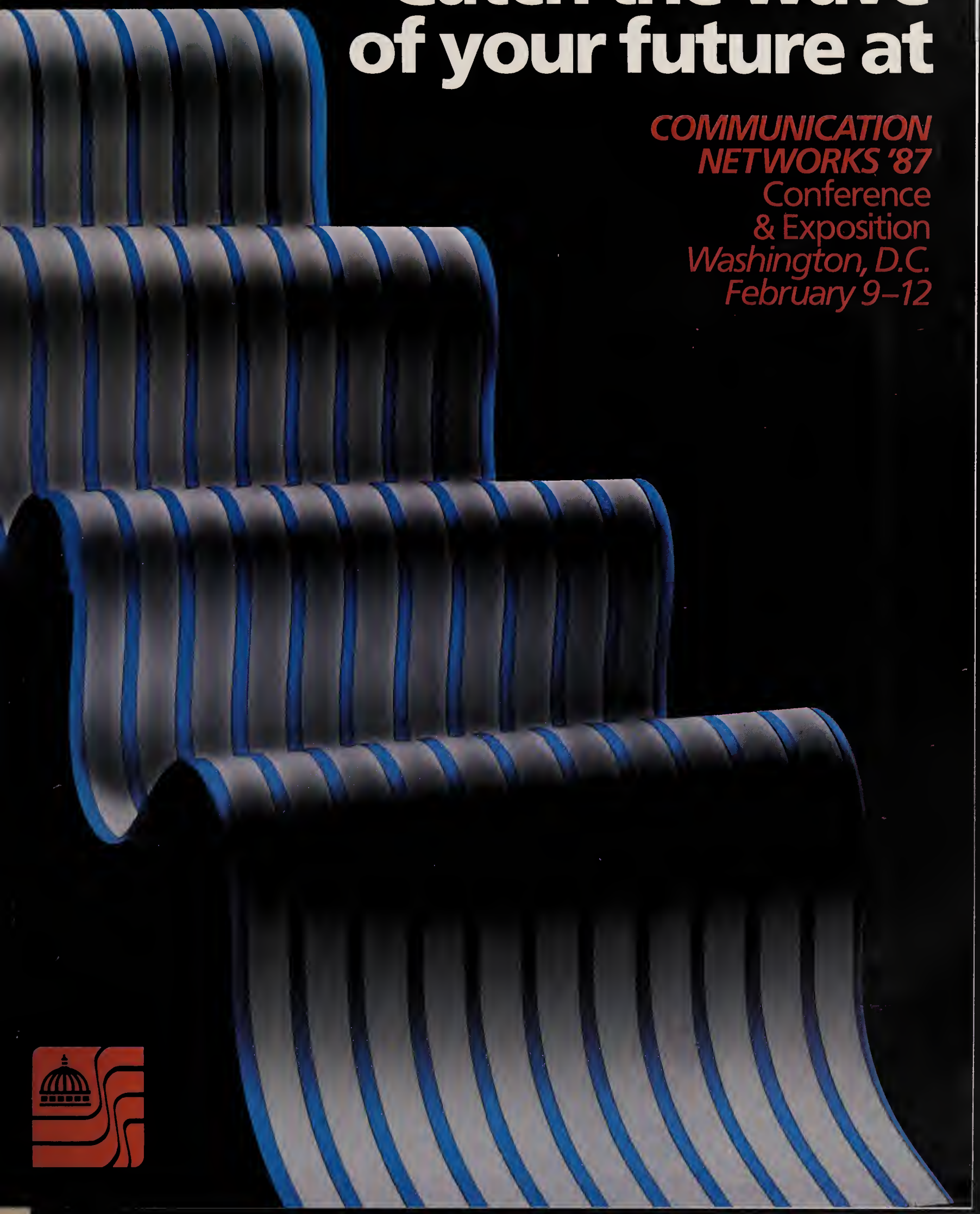

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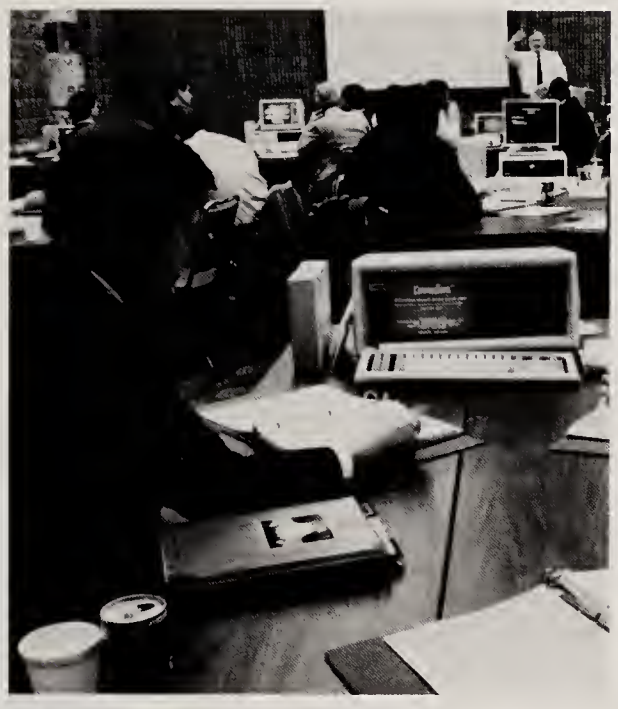

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Town Meeting

Modified Final Judgement—Anti-trust Settlement Impact on the Telecommunications Industry After Five Years

Since divestiture, the telecommunications industry, regulatory agencies, Congress and Judge Greene's court have been adapting to the brave new world of telecom. This year's Town Meeting—always a popular session—will reflect on the Modified Final Judgement. Join **Richard Wiley,** Conference General Chairman, and participate in a lively debate with these major players:

Robert Allen, President and COO, AT&T

Samuel Ginn, Vice Chairman of the Board, President and CEO, PacTel Corp.

Albert Halprin, Chief, Common Carrier Bureau, FCC

Peter Huber, Consultant, Dept. of Justice

William McGowan, Chairman and CEO, MCI Communications Corp.

Richard Wiley, Senior Partner, Wiley, Rein & Fielding

Conference Program

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7:30–8:20 am

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The eight tracks of conference sessions cover a comprehensive range of topics. The track titles provide an indication of the breadth of topics to be presented at Communication Networks '87.

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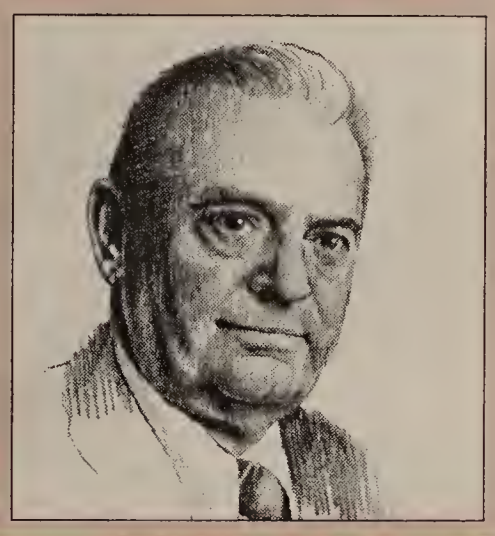
Interview

After a slow start, retail gets on-line

John Chay has been involved with computer systems in the retail world since 1955. He has worked for such retailers as Abraham & Straus in New York, Thalhiemer Brothers, Inc. in Richmond, Va., L. S. Ayres & Co. in Indianapolis and The Broadway in Los Angeles. Chay joined the National Retail Merchants Association in 1979 as vice-president of the information systems division. He spoke recently with Senior Editor Glenn Rifkin.

Has the growth of computers in retailing been slow and steady or just very intense recently?

It's gone in plateaus and surges. As the retailers had money from the ecomony exploding, it might surge upward. When the recessions came along, the austerity programs went into effect. There was little development work going on as a general rule. The climb has been steady. The biggest single thing that has affected the growth has been the microcomputer. In retailing, like other industries, 80% of the business is done by 20% of the companies. So all of a sudden, with the appearance of the microcomputer, that 80% of smaller guys got a shot to do some of the things some of the big guys have been doing.



In retailing, 80% of the business is done by 20% of the companies. With the appearance of the micro, the smaller guys got to do the things the big guys have been doing.

For the bigger retailers, what would be the key change in the last five years in terms of computerization?

They discovered that the enormous amount of historical information they have been building for years within their files, on sales and operational aspects of their business, was an invaluable resource. Now they are beginning to try to find ways to access that as a very positive tool in their management decision making and planning.

They say, "This is being done in some of the other industries, why shouldn't we be doing it in our own company?" The whole concept of artificial intelligence, or expert systems, or strategic planning based on volume, is now synthesizing or washing down millions and millions of bits of information into practical and useful tools to direct the business.

What is MIS's role in retailing?

Traditionally, the retail organizations have had big computer shops and centralized control. Again, retailing is hard to talk about generically because you have different kinds of entities within the retailing industry. But as a general rule, the concentration was in big computers in one location or regional locations and the control being conducted from headquarters.

End-user computing in retailing has been very slow to catch on because the technology has followed the design and buying process of the merchandising divisions that are the guts of the retail business. When buying had been concentrated in one location or regional locations, the power was there. So the stores were given a book, "Here's how to run the store, now run the store," and headquarters decided what merchandise to send them.

Little by little, more decision making has been delegated to the stores, and that's another trend in retailing: Providing some of that informational magic and knowledge to the stores as opposed to just collecting information out of stores, into a headquarters computer and running things from headquarters.

Compared with the use of computing at huge corporations such as General Motors Corp. or American Airlines, where is computing in the retail arena — still years behind?

If you compare retailing to the airlines, the brokerage business or banking, those folks are ahead of many retailers in the exotic and advanced applications techniques. How big that gap is, is hard to speculate. I don't imagine it's more than two or three years.

Is merchandise planning the key application computers address?

That's the guts of the retailing business.

Beyond expert system or AI programs, how do you use computers in this merchandise planning area?

That's tough, because first you have to recognize that within merchandising, there are distinct requirements for distinct kinds of merchandise. Big-ticket items, such as furniture, carpeting, major appliances, are controlled on the basis of a serial number. The next level is high-fashion, expensive apparel that is controlled on a size and color basis: women's coats, men's suits, shoes. You have to control those at what are called SKU, or store keeping unit, levels.

Then you get the very inexpensive things like pencils and pens, which you control by classification. You want to make sure that in your stationery department you have enough boxed sets of this price line.

Each of those levels, or types of merchandise, is treated differently within the stores depending on how the store approaches its overall merchandise plan. Generally, some kind of dollar controls are established on high, and then you use the merchandising expertise to provide the best assortments. The next part is monitoring sales to see where adjustments are necessary: reorders, markdowns, transfer of goods between stores and that kind of thing. Where there has been little work done is in that planning process, which is dependent on prior years' results. That's where you become dependent on a buyer's intuition or technique to select the right merchandise.

But that's still a very human decision, not one a computer can make unless you've got an expert system that's known to work — and I haven't heard of any in the retailing area.

It can establish trends in price lines that tell you, "This looks like the hot price line coming up this year based on what's happened over the last five or eight years." It can tell you that you need, in a particular classification, 36 dresses in this price line and 20 in this price line. It can provide a lot of that kind of information that the buyer can't assimilate in his head.

Does that preclude any off-the-shelf packages from being of much help in retailing where each company has such specific needs?

Absolutely. Some companies have expertise internally, particularly on the users side, and they've also got the expertise on the technical side. Places like Zayre Corp. have learned to marry those two capabilities to optimize the end result. Any software company would have to pay a fortune to get that kind of knowledge together under its own roof.

So how are they working together? Are people at Zayre calling IBM and saying . . . ?

No, I mean internally. The computer people and the merchants at Zayre have built bridges over the years. They have taken people out of merchandising and put them in their MIS group and taken people out of MIS and put them in merchandising. That seeding has blended the organization to work together toward that common goal.

You're seeing that trend in big retailers?

Absoutely. In that particular field, Zayre and Carter Hawley Hale have done some interesting and beneficial work.

What about the large vendors? How are they responding in the retail area?

IBM has done a lot of software development in this area over the years. It has always offered retail software packages and now endorses others as well. The real market for that, I believe, is mid-scale and down.

So the large users are writing their own software?

Yes. Those folks are going to insist on doing the software development themselves because they know what they want. A chain of 30 stores doing a $100 million a year, if they don't have a computer, can go out and buy stuff off the shelf that can work very well for them. They just have to make a few minor adjustments.

Are you seeing more of a decentralized or centralized environment emerge in retailing?

There again, different corporate structures have emerged. Everything from "Corporate gives you the book and this is how you do it," to "Corporate says, 'We don't think you ought to buy that.' " Most of the places have accomplished some degree of centralization and allow for some local autonomy that makes a lot of sense.

Almost every division of the large department store groups has a relatively high degree of autonomy. Bullocks, Abraham & Straus and Filene's being members of Federated Department Stores, Inc., still have a large degree of autonomy. Jordan Marsh in Boston and Jordan Marsh in Miami are two different worlds computer-wise, although there is a high degree of control from headquarters.

If they've all got similar systems, what is going to give one retailer a strategic advantage over another?

There are several factors. The first is selecting the data that they choose to embed in their strategic systems; identifying those truly useful pieces of information that will influence their planning and measurement effectiveness. The second is the ability to choose outside data to blend with their internal data and how they interpret that and blend history with today's information and analyze it.

One of the key things is going to be the extent of the business experience of the king of MIS in that particular company — how much he's been able to absorb in terms of what's important in the management of the company and that merchandising process and how much the top two or three people in the enterprise have become aware of the opportunities of technology. Those two factors are probably the key in the overall design and development of these expert systems. ■

Retail cashes in on PCs

By PETER COHEN

Get the right merchandise at the right price to the right place at the right time; this is the key to success in retailing. To assist in this monumental task, America's largest stores have long used sophisticated computer systems. J. C. Penney Co., for example, has an annual data processing budget of several million dollars and uses nearly 50 mainframes and more than 45,000 point-of-sale (POS) terminals to manage inventory, track customers, order merchandise and perform other critical retail functions.

Similar problems confront small stores as well, but until recently they relied on manual systems. Before the introduction of personal computers, limited budgets precluded the smaller retailers from purchasing and using computers. Affordable PC-based systems now give these small retailers benefits similar to those enjoyed by the largest stores in the industry.

While the large chain stores are ubiquitous, most of the two million stores in the U.S. are small operations employing fewer than 10 people. These businesses will buy many of the PCs sold to the retail industry. Shipments to small stores will account for a large portion of the projected 22% annual PC sales growth from 125,000 units in 1985 to more than 300,000 units by 1988.

The True Value Hardware store in Columbia, Tenn., owned by Bill Patterson, has installed a PC-based system to automatically track about 10,000 items in inventory. The system functions on Pro/Hardware software, an application package developed specifically for hardware stores by Automated Systems Design, Inc. in Nashville.

The package runs on an AT&T 6300 Personal Computer equipped with a cash drawer and a dot matrix printer. The system is used as a POS terminal in place of a cash register and for managing inventory, purchase orders, customer mailing lists and invoices. The single POS system and a second 6300 PC with a hard disk for office applications have allowed Patterson's business to expand without excess inventory and a full-time bookkeeping staff.

Equipping the PC with a cash drawer offers several advantages to the small retailer. The unit is multifunctional. It operates as a cash register during business hours. After closing, the PC is available for inventory management, accounting or any other application the owner cares to run. This configuration eliminates the need for a separate POS terminal or electronic cash register.

The PC can also make more information available to the operator at the point of sale than is available through a cash register. The sales agent can be apprised of the customer's credit standing, mailing address or recent purchases with a PC-based POS system.

Application software developed especially for retailers, like Pro/Hardware, is becoming increasingly available. Such packages are indispensable for small stores with no in-house programming expertise. About 500 retail-specific packages are on the market. Though this offers retailers a wide choice in price and functionality, they should carefully assess a package's track record and its vendor's capability to support it.

PCs have also found a market in medium-size retail chains. The flexibility and cost advantages of micros make them particularly attractive to rapidly growing specialty stores. David Victorino, controller of ACA Joe stores, made the decision to replace electronic cash registers with a PC-based system, citing "the flexibility it gives in growing the system."

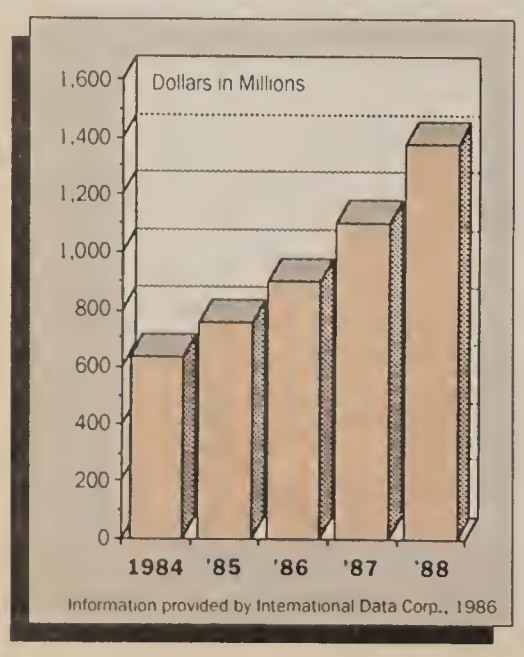
ACA Joe, a merchandiser of men's casual wear, has grown from five stores in mid-1985 to nearly 100 today and plans to have another 100 stores across the U.S. by the end of 1987. When the transition from electronic cash registers to PCs is completed, each 1,200-square-foot store will have a single IBM Personal Computer XT with a cash drawer and a dot matrix printer.

Each ACA Joe store's PC is equipped with a modem and transmits sales and inventory data overnight to an IBM System/38 at the firm's headquarters in San Francisco. In this fast-growing chain, moving inventory quickly from one location to another is critical to success.

The MIS staff preconfigures each system, installing the software and

MITCHELL J. HAYES

SHIPMENTS OF PCs TO U.S. RETAIL INDUSTRY



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assembling a starter kit with an installation checklist, printer forms and user manuals before shipping the system to individual stores. The fine-tuned installation procedure takes a store owner a matter of hours. The MIS staff has found that training sales help on the system is easier and takes less time than training on an electronic cash register.

As an alternative to dealing directly with the hardware and software vendor, as ACA Joe has done, retailers can purchase turnkey systems from value-added resellers (VAR) or value-added dealers. More that 100 VARs and value-added dealers maintain expertise in micro-based systems for retailers.

These firms may provide hardware, application and communications software, installation, training, support and service. Their expertise is particularly valuable in complex installations with existing POS terminals, electronic cash registers and PCs distributed across multiple stores and a central minicomputer controller.

While ACA Joe has opted to replace its electronic cash registers with PC XTs, retailers may choose to add personal computers without rendering their existing systems obsolete. Leading POS and electronic cash register vendors now offer a means to integrate PCs. NCR, for example, offers the 2114/PC Retail Management System. Up to 32 in-store electronic cash registers and unlimited remote locations can be linked to an NCR PC running inventory management software.

By no means are large stores closed out of microcomputer applications. PCs have found their way into nationwide department stores amid sophisticated mainframe-based systems with extended networks of POS terminals. Attempting to effectively integrate PCs into these complex systems, however, has delayed a rapid and widespread adoption of personal computers in large stores.

The most successful installations to date have used PCs for unique strategic applications designed specifically to boost market share and revenue. Mainframe and mini systems handle the traditional efficiency applications, such as inventory management and accounting. ■

Cohen is a senior consultant with International Data Corporation.

Continued from page 48

demonstrated the ability to significantly lower inventories, a boon to the cost-conscious retail mindset. Undoubtedly, more is needed.

The basic tenets of retailing are simple: buy, sell, replenish. But within that cycle are countless questions that can, if they are answered correctly, make a huge difference in revenue.

Merchandise planning, for example, has come to the fore as area in which computers can provide a significant edge if utilitized properly. According to Coopers & Lybrand's Zimmerman, the meshing of merchandise and financial planning is being done with success in some cases.

"It is the most difficult to do but has the most payback," Zimmerman says.

Gaining the strategic advantage

"You can gain a strategic advantage by knowing what items are moving well and what are not and what goods you have where in a timely fashion," Neill says. "The more accurate the information, the more accurate decisions can be made."

According to Neill, virtually all large retailers are computerized now, so the advantage will come from specific implementations within each business.

"There are people who do a much better job than others. They just have tighter control over inventory, buying and distribution," he explains. Inventory control is crucial to success in retailing, and both medium and large retailers are seeking ways to gain an advantage in this.

Inventory accounts for a high proportion of a retail store's assets, and the low margins found in retail require high sales volume and rapid inventory turnover.

Consultant Larson points out that inventory control is an essential element of success for small and medium-size retailers.

"With all those transactions, you need a lot of control," he says. "I've seen successful systems lower inventory by one-third by helping to broaden the selection and improve sales."

Distribution issues, especially in huge chain-store operations, are also critical. Zimmerman points out that the more stores in a chain, the more important the decisions as to where to put the merchandise.

"It's a simple idea," he explains. "Can I get the right merchandise to the right place at the right time?"

In that vein, innovative retail MIS shops are looking at creating data bases that track an item from its lowest common factor, the stock keeping unit, and follow that item from its creation to the shopping bag, with an eye on each discrete activity along the chain, such as loading, handling and drop/ship.

"The idea is to find the most efficient way to deal with that product," Zimmerman says. "You couldn't do it without computers. It will eventually change the way people work in this area."

Although there is a long way to

Continued on page 54

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Continued from page 53

go, leading-edge retailers are also working in the area of expert systems, hoping to find methods for turning a buyer's genius into a software program. With artificial intelligence introduced to future retail systems, merchandisers could receive suggested courses of action that would optimize the selling cycle.

"It could change things dramatically," Neill says. He is hopeful that buyers can use systems to address such continuous setbacks as having the proper-size items in stock. "No retailer seems to get the size mix correct," Neill explains. "There are always lots of smalls and extra-larges but never enough mediums. Computers could certainly provide statistical analysis that would help in that. It seems obvious, but it is not as simple as it sounds.

"And besides, you won't ever get rid of overruns. With fashion merchandise, there are model changes, seasonal changes and differing tastes. And if you reduce inventories too close, you won't have the item in stock. You can fine-tune the problem, but you can't eliminate it," Neill adds.

Jack Brill, a retail industry consultant for IBM, adds that computers will soon find their way into another untapped arena — computer-assisted design of stores. Retail outlets, he points out, are constantly redesigning store layout, shelf area and displays.

Department stores, for example, are constantly tearing down walls and rebuilding to create new looks for their merchandise.

Systems can be used to help maximize the redesigned space to get optimum use of alloted areas. Wal-Mart Stores has already begun doing this type of design on an IBM 4300, according to Brill.

Boxes and boxes

Retailing has embraced a myriad of technologies, especially in larger companies. Virtually every retailer in the $50 million range and up is mainframe based, with IBM holding 85% of that market.

What is emerging, according to IDC, is a market for cost-effective in-store processing on minicomputers, supermicros and personal computers. Users are seeking to give better data to individual store managers and to off-load data from the corporate mainframe.

A technology unique to retailing, the mainframe-based point-of-sale terminal is reaching a saturation point in the largest U.S. retailing segments, according to IDC. The market was $342 million in 1984, and IDC expects slow growth to $540 million in 1988. In fact, most of the large retailers are on their second- or third-generation POS system already.

The vendors selling into this market — NCR Corp. and IBM are the largest — must start looking for business in upgrades, add-ons and service or must start penetrating the small and medium-size retail outlets that have thus far eluded them. Kleinberger, however, says he believes that POS terminals might be considered "the most important piece of technology ever to hit the retail industry." A POS system functions as both a sales transaction device and a management reporting device.

Rather than looking at it as a saturated business, Kleinberger says retailing is at the beginning of a new generation of POS terminals that are based on microcomputer technology and thus are programmable and more flexible and powerful than their predecessors. IBM recently introduced its latest POS system, the 4680 Store System, using a Personal Computer AT as the in-store controller.

"When we look at the trends," Kleinberger says, "the changes we see are not so much in the technology but in the way POS terminals are used in the store." There is, he points out, an increasing trend to put some of the power and information provided by POS terminals into the hands of store managers. This is being accomplished by linking POS terminals to micro- and minicomputers that support in-store system needs such as credit management, merchandise information, price-change control

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and receiving.

NCR's Carl Steinmetz, vice-president of retail systems, agrees with Kleinberger's assessment. "We're expanding our POS systems to complement the mainframe environment," he says.

The systems are modified to solve a particular retailer's needs, Steinmetz adds. "Our customers are asking for many things, but the pervasive term I hear is 'distributed processing.' People are getting away from batch orientation and distributing more and more information down to where it is needed to make decisions."

Steinmetz says he believes that MIS in retail is just beginning to understand the value of distributed processing through POS systems in its stores. "MIS is choked with applications demands from headquarters," he says. "And end users are starting to see that there are packages out there that can help them without waiting six years to get what they want."

The in-store systems are further being linked with headquarters and the distribution centers to form sophisticated communication networks that speed up the flow of data and messages through electronic mail.

IBM's Brill points out that sophisticated retailers such as Carter Hawley Hale Stores, Inc. are embracing such technological breakthroughs as electronic invoicing with suppliers, thus avoiding overdue bills and telephone tag.

"Electronic ordering can be awfully important for the bottom line," Brill says. "Information still creates paper, which needs to be rekeyed into the system. With electronic ordering, decisions can be made faster and better. There are certain kinds of merchandise that stores should never be out of. This will be like just-in-time delivery. It's an area that is poised to take off."

The personal computer, now a ubiquitous member of most large retail front offices, is also making dramatic changes in small and medium-size companies. Small micro-based systems are allowing retailers without Sears-size budgets to automate (see story page 50).

Also on the horizon, though not as close as once thought, is videotex, or shopping at home. Sears, for example, is involved in a videotex joint venture with CBS, Inc. and IBM called Trintex. As home computers proliferate, videotex may well become an added MIS responsibility. After a spate of publicity five years ago, videotex has thus far failed to live up to expectations, but Sears' Carlson says he believes in videotex's potential.

"It may not replace the shopping mall, but that capability is going to become part of American retailing down the road," Carlson says.

The bottom line: Serving the customer

As was mentioned at the outset, America's shoppers, the retail customers, have yet to recognize significant benefits from retail automation. Perhaps that is because the retailers have concentrated initially on improving profitability and are only now turning toward customer service.

According to Kleinberger, real opportunities for retailers will continue to build as applications development shifts toward marketing functions and sales promotion. "These areas," he says, "will require the next big wave of systems development investments."

Kleinberger predicts retailers will realize a more competitive position by using their information systems to develop special services for their customers.

"Such concepts as direct product profitability will allow retailers to focus assortments more effectively," he explains. "Data base technology will lead to huge data bases of customer information, competitive information and demographic data that will permit retailers to understand where opportunities really are by customer segment and classification."

In the long run, the goal for retailers is simple, as expressed by Zayre's Bilotti. "With new and better systems, we hope to stay one step ahead of everyone else. We want our customers to sense that our store is a better place to shop." ■

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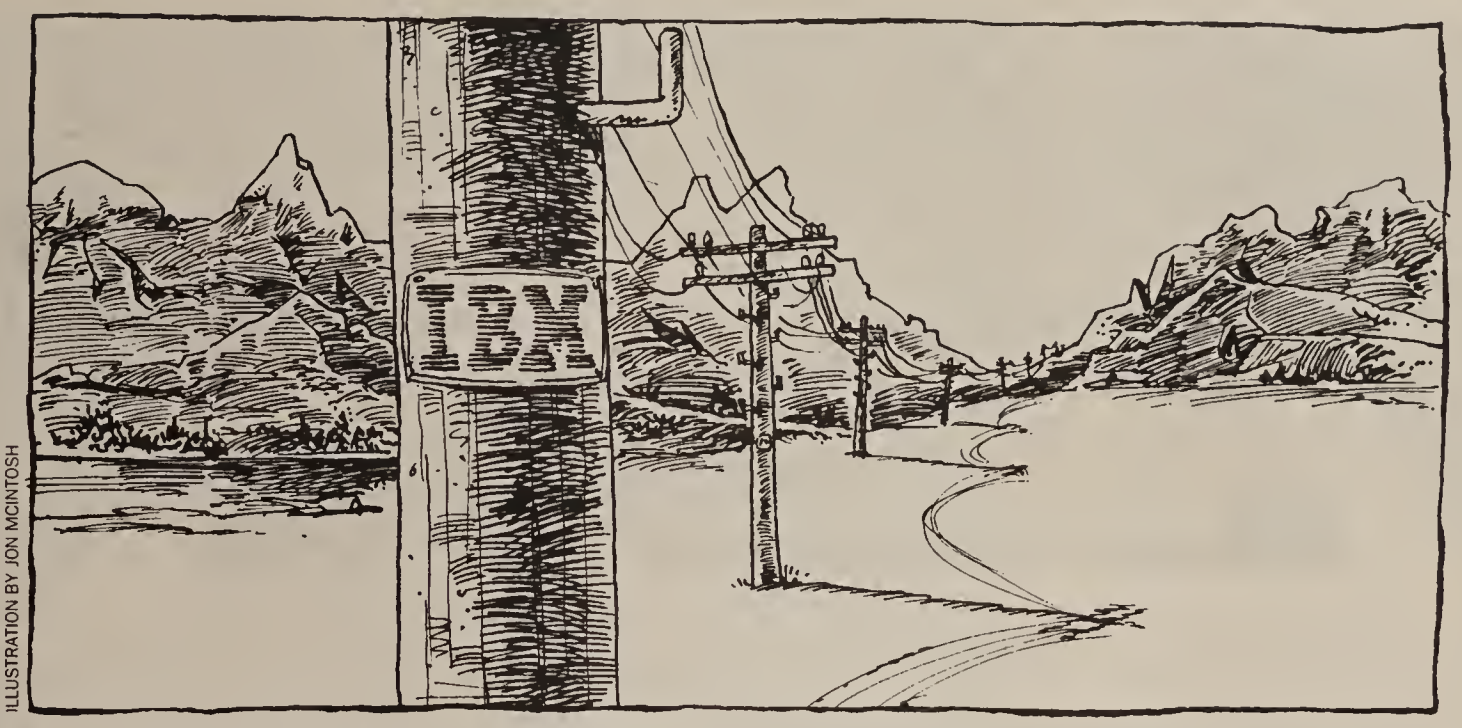
In Depth

Telecom: The new pawn in the IBM empire?

An international telecommunications network would greatly expand IBM's power. But only by winning the U.S. can IBM hope to win the rest of the world.



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By RICHARD THOMAS DELAMARTER

We have become a worldwide society of numbers . . . We define quantity using numbers. We define quality using numbers . . . We now can reduce everything we do to a number language to be acted upon in machines.

— Commentary in IBM'S Madison Avenue museum of calculating machines

If society continues to perceive itself increasingly in terms of information, "reducing everything" to an intangible but nevertheless valuable stuff — stuff that can be produced by machines here, made to flow there and processed, stored and sold according to the economic laws of scarcity — then the company that controls the technology for performing those tasks stands to gain enormous power over us all.

IBM has overcome all competition in the data processing market. The methods that have given it such great commercial success so far will be just as useful in the future for it to conquer the vast array of emerging information-related markets.

Consideration of IBM's growing economic and political power is rare in current discussions of this "information age" we are said to be entering, but a full understanding of this historical moment requires that the IBM phenomenon and its dire implications be grasped fully. Judging by the statements IBM makes to investors and to the public, it sees no bounds to its continued expansion. All that can be defined as "information" seems fair game.

What follows is an informed speculation as to the directions that this expansion is likely to take and how IBM will exploit its current monopoly to get there. Key to this analysis is the idea that IBM is seeking to capture the high ground in the worldwide communications market just as it has in computers.

From that position, and from a further entrenchment in computing, will flow power in potentially every market that depends on interconnected computers — from telephones to robotics, from publishing to genetic engineering, from entertainment to banking, from education to public administration.

The first global telephone company

Soon IBM will become the first — and likely the only — worldwide telephone company. Working from its monopoly in computers and its growing strength in telecommunications, IBM will begin providing telephone services throughout the world and connecting people together on much the same scale as it now connects computers.

IBM the global phone company? Preposterous idea. Impossible, you might say. After all, AT&T is the undisputed world leader in communications. And all the nations of the world already have their own politically approved telephone monopolies in place. Besides, IBM makes its money processing data, not selling telephones or moving calls between them.

All true, but given the company's aggressive goals for future growth, its solid ties with virtually every substantial corporation in the world and its freedom to price discriminate across whatever boundaries it encounters, IBM the telephone company seems much more than just likely — it seems inevitable.

To see how easy it will be for IBM to establish the dominant global communications network, we need to consider a few basic facts. IBM's business continues to rely heavily on a relatively few large

About the author

Reprinted by permission of Dodd, Mead & Co. from Big Blue: IBM's Use and Abuse of Power, *by Richard Thomas DeLamarter. Copyright © 1986 by Richard Thomas DeLamarter. DeLamarter was a senior economist for the Justice Department who worked on the government's antitrust case, U.S. v. IBM, for eight years.*

corporations in the world — no more than a few thousand — for most of its growth and profits.

These companies' operations are dispersed throughout the world — a factory here, a marketing branch there — and each seeks to maximize its overall efficiency by integrating its international activities through telecommunications networks that carry data, voice, video and facsimile.

Although every international office will not get its own mainframe computer, each will have telephones and most will have Telex terminals and small computers. As the complexities of global-scale business grow, corporate activities come to depend ever more heavily on the different networks of these various communications devices.

So much so, in fact, that there comes a point where it becomes economically compelling to combine all networks into one. Costs are reduced, performance and function are boosted, and control is enhanced.

An illustration on a recent Citicorp annual report boasts not of bedrock money vaults or of smiling tellers, but rather of the communications satellite that forms the heart of a global Citicorp network.

To be sure, not all transnational companies can justify owning their own satellites, but all want to avoid the headaches and expense of linking machines across national boundaries. As things stand today, each of the world's telephone companies is its own empire, a state-approved monopoly company that tightly controls communications within and across its national boundaries.

Those international telecommunications treaties and agreements that do exist have done little to erase is the differences among each country's pricing, network interfaces and range of services. Each country's telephone service is unto itself, shielded since its earliest days from technological and regulatory advances elsewhere and purposely kept different from others.

In the face of such diversity, IBM the global telephone company would surely be welcomed by large corporations that, don't forget, are already the heaviest users of IBM computers and related networking products.

IBM could conceivably eliminate the hassles of running multinational telecommunications networks by providing much-needed services at prices lower than those charged by local phone companies. If problems arose in a customer's international network, he would have to make only one call, to IBM, rather than hunt down the problems from country to country, vendor to vendor.

> ***"The methods that have given IBM such commercial success will be just as useful for it to conquer information-related markets."***

Transcending national boundaries, as it is already attempting to do with a series of well-placed communications satellites, IBM would become a one-stop shop for all sorts of telecommunications gear and services. It could piggyback voice, video and other communications channels on its firmly anchored data networks.

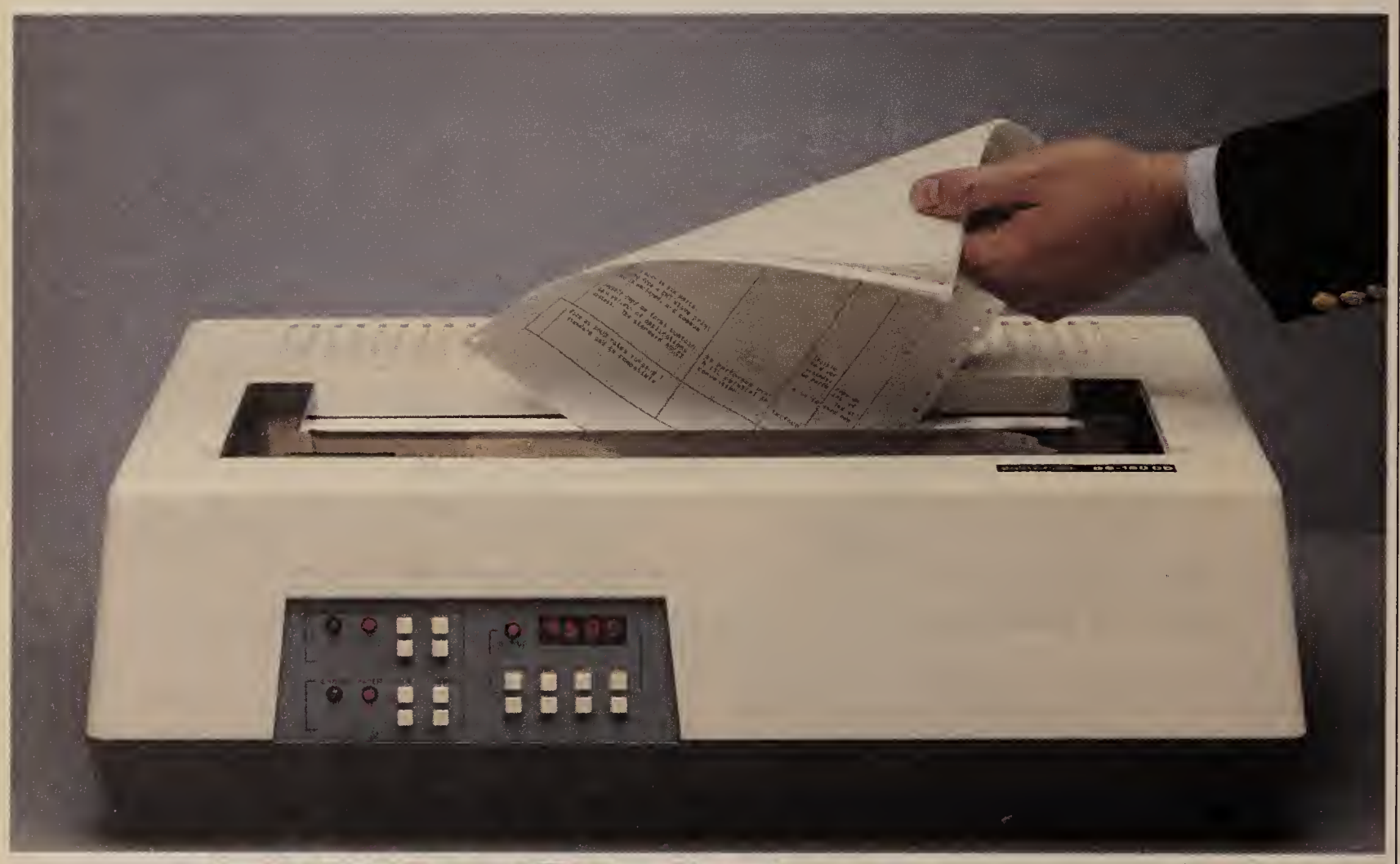
One-stop shop

IBM has already taken many steps toward this goal. It has helped many of its big U.S. customers build multipurpose networks on a national scale. There seems to be nothing to stop IBM from helping them expand internationally.

In 1984, IBM paid $1.25 billion to purchase Rolm Corp., a leading maker of small communications switches. Then, in late 1985, IBM dropped broad hints that it would soon enter the telephone central switch market as part of an effort to double its sales of telecommunications gear in Europe.

It also invested heavily in MCI Communications Corp., a long-distance telephone carrier. IBM has worked closely with Motorola, Inc. and the Public Broadcasting System to establish a nationwide network for radio links in the U.S.

Meanwhile, throughout the world, IBM and its agents are lobbying intensely for rapid deregulation of local



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telephone monopolies.

An international telecommunications network would greatly expand IBM's power. IBM could change network interfaces and exclude competitive computer equipment as it desired, thus limiting other equipment vendors' competitiveness.

Once its global network was sufficiently established, there would be an irresistible attraction for even corporations using non-IBM computer systems to attach to it — if only to make efficient links to other companies' computers — and to eventually do all their data processing with IBM systems.

IBM could bundle communications with data processing into a singly priced service offering, thus again enjoying the benefits of a lease-oriented business. The possibilities seem unlimited — and scary, to the world's many phone companies.

These companies rely on the same large commercial enterprises as IBM does for most of their profits, and they do not want to miss out on data communications as a major growth market. Once IBM is able to service those large customers in a way that nationally confined telephone companies cannot, the latter would begin to lose that high-profit commercial business while still being obligated to provide telephone service to low-profit residential customers. IBM, of course, would escape all such obligations.

'Natural' monopolies

To understand the great advantages IBM holds over all the world's telephone monopolies, including the giant AT&T, requires a comparison of its structure to theirs. In most countries, the telephone authority (usually known as a Postal, Telephone & Telegraph, or PTT) is considered to be a "natural" monopoly and either is an arm of the government or is at least held politically accountable through some sort of regulation.

But no matter what the method of control, the purpose of such regulation is to ensure sufficient revenue to cover the necessary costs while achieving political and social goals. IBM, on the other hand, is not officially perceived to be a monopolist and has avoided all regulation. It is free to do as it pleases.

Once governmental supervision is in place for one purpose, it may begin to intervene in other ways. Often there is a belief that by tampering with the natural monopolist's pricing structure — for example, by systematically discriminating between different classes of customers — the total value of the service may be improved relative to what would result from purely cost-based pricing.

In theory, everyone benefits from such governmental tampering. As the regulators transfer funds from one part of the monopoly to another, its overall profits are kept stable, enabling the average price paid by the majority of subscribers (in other words, residential customers) to be kept low.

This same pricing pattern has been in place throughout the world for decades, although the degree of discrimination varies by locale. In Japan, for example, the prices of long-distance calls in 1985 were 40 times higher than underlying costs would dictate, while in the U.S. the comparable factor was only six. In Europe, to take another example, the monthly rental for the private, 10-kilometer voice circuits typically used by business customers varies from $129 in West Germany to only $24 in Sweden.

These price differences

> ***Once its global network was sufficiently established, there would be an irresistible attraction for even corporations using non-IBM computer systems to attach to it — if only to make efficient links to other companies' computers — and to eventually do all their data processing with IBM systems.***

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are the result not so much of different costs but rather of different discrimination formulas being applied to achieve specific political goals. Incidentally, politicians have benefited greatly from this price discrimination in communications services, for they can, through manipulation of the regulation mechanism, impose a tax on one set of constituents — often the nonvoting sector of the country that business represents — to improve telephone service for, and win votes from, the much larger set of residential customers.

After decades, this clever system has begun to break down under pressure from rapid advancements in telecommunications technology. Microwave and satellite-based transmission links, to name two important technical developments, offer long-distance communications at costs well below those typical of traditional copper wire, and they are increasingly available beyond the PTTs' monopoly control.

Stuck with miles of comparatively costly terrestrial wires and expensive rights-of-way, PTTs could not match the new equipment's low costs and therefore could not deliver competitively priced services. Yet protecting phone companies from these more efficient competitive alternatives only increased the inefficiency of this basic industry. So efforts to remove the PTTs' status as natural monopolies began.

Technological changes resulted in governments finding it impossible to oversee the PTTs effectively. Changes began to happen too fast, and the issues were too complex to be dealt with by the established regulatory agencies. Governments had to decide who could compete in this important business, under what conditions and — if PTTs were to be permitted to compete — at what prices. For example, the PTTs' big central switches were coming to be based on computers, and they could now deliver services comparable to those delivered by private branch exchanges (PBX).

Meanwhile, so-called value-added networks were being built, not only to move data but to process it on the way; incompatible messages could be translated from one vendor's format to another, stored for later recall or distributed automatically to many destinations. Constant monitoring by regulators of each price change that PTTs seek in their competitive struggles has become next to impossible.

Technological changes and the new service options they have made possible have naturally appealed most to large customers, which pay the most to the telephone companies and are most able to afford the hefty initial investments of purchasing more of their own equipment.

Unplug AT&T

Increasing numbers of large U.S. corporations, for example, have begun to unplug from AT&T and its former affiliates and are installing private communications networks. Once the proper equipment became available, large customers were able to bypass all or part of the telephone company's network and, to a large degree, escape its discriminatory pricing. They have brought in their own satellite antennae, communications switches and even microwave towers.

The existing order in communications has been undercut not only by the technology but also by economic factors. For example, underlying the telephone companies' price discrimination has been the assumption that all commercial organizations should be affected equally. That is, price discrimination in communications had no effect on the competitive process within a country, since the "tax" it imposed was at the same rate for all commercial customers. No customer gained a significant advantage over the other.

Once bypass technologies became viable, however, large companies gained an advantage over small ones, for the latter could not afford their own networks and evade the telephone company's price discrimination. The result is that small companies have been forced to cover more than their share of the costs incurred by low-profit, residential customers. Large companies that bypass the PTTs avoid such "taxation."

By the same token, traditional PTT pricing policies threaten to degrade the competitiveness of entire nations as they strive to shift from heavy industry to the information-intensive, service-oriented industries of the future. Services such as banking and insurance depend heavily on communications for their value, and any nation stuck with uncompetitive communications pricing is likely to lose ground in the emerging global services market.

A service supplier being charged too much for communications in one country may decide to boost investments in places where communications is priced closer to cost. Yet to reverse decades of history and move to cost-based pricing would mean trouble for the PTTs and their governments. To compensate for lost profits from commercial subscribers, they are forced to raise prices for the subsidized residential subscribers — hardly an attractive path for most politicians.

Into this complex mix of technology, economics and politics has stepped IBM. It occupies the high ground. Not only is it wealthy and free of regulation, but its main business is to provide worldwide service to high-volume commercial customers. Additionally, communications is of major importance to the company, both in the U.S. and abroad, for its use encourages hardware and software sales; the more computers can be made to communicate with each other, the busier they can be kept and the more often customers will upgrade them.

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along with the large customers it depends on, pressure the world's PTTs either to change their pricing and provide better, lower priced services for commercial use or simply to let IBM provide communications services as well as computer systems wherever needed.

And IBM will prevail, for it holds significant advantages. It is less constrained by the peculiarities of each country's network and can eventually offer international data communications links that are optimized for use with its 370 line. Parochial interests restrict the abilities of the PTTs and prevent them from confronting IBM across the global front.

IBM has systems installed worldwide that can absorb great development costs and provide it with functional leverage into new markets. Its larger customers will surely take advantage of its global communications offerings, when they become available, and leave the PTTs to tend to low-profit residential and small business customers.

Ironically, it seems, IBM the unregulated monopolist is becoming the champion of unfettered competition, of more cost-based pricing in communications and of breaking the power of telephone monopolies everywhere.

The ill-fated governments of the world may fight rearguard actions by putting up obstacles to the free flow of data across their borders and favoring local suppliers with contracts. But these governments will risk leaving their major corporate customers exposed to more efficient foreign competition in the most important service markets of the future.

Alternatively, foreign nations can accept the inevitable and join IBM instead of fighting it. Not only would doing so lower the direct expense of supporting their local computer companies, but it would also ensure that local banks and other service suppliers are not burdened with relatively inefficient non-IBM communications.

IBM has a wide range of sweeteners with which to placate obstinate PTTs and foreign governments. It can purchase equipment from local suppliers — which it did to the tune of almost $2 billion in 1984 from more than 50,000 suppliers in Europe alone — as well as invest in local plants and make cooperative arrangements with local schools, research centers and companies.

Of course, no matter what deals it offers the nations of the world, IBM's success in global communications requires that it actually have the necessary productivity-enhancing computer and communications systems its customer-partners need.

As we have seen, the company's communications marketing record leaves much to be desired. Besides ignoring customers' desires with its deliberately perverse 3705 controller, it failed several times to build a marketable PBX product.

In the end, IBM was forced to shop around for an entire PBX company and ended up paying a premium price for Rolm.

Most telling, however, are the company's great difficulties in getting its unreasonably diverse set of incompatible computer families to communicate effectively with each other.

But even if it takes IBM years or even decades to get its communications act together — recall that it took IBM many years to make the OS operating system work properly — it still stands to win the global communications market against all foreseeable challengers.

> ***Ironically, it seems, IBM the unregulated monopolist is becoming the champion of unfettered competition, of more cost-based pricing in communications and of breaking the power of telephone monopolies everywhere.***

It will continue to monopolize the central hubs of future networks, the large-scale 370 mainframes, and that will give it profits and powerful leverage with which to improve its research and development of communications products (particularly software) and buy whatever else it needs.

IBM can marshal other resources. Simply by publishing more information than usual about certain interfaces, it can invite the rest of the industry to design and offer products that enhance any of its systems that are particularly deficient or that face strong competition.

The add-on business that such an "open architecture" strategy fosters is not permanently lost to IBM, of course. Once its customers are wedded to the IBM computer system that others have enhanced, and once IBM has designed its own add-on capabilities, it can begin to close the system's architecture to outsiders.

A subsequent variation of the original system may be designed to preserve customers' software investments even as it closes the door to others trying to attach products. IBM can begin withholding critical interface information that the outsiders need and limit customers' choices to its own high-priced products.

To be successful in its quest to become the dominant global communications carrier, IBM will, of course, have to best its U.S. rival, AT&T. Even divested of its Bell operating

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companies, AT&T remains the largest telephone company in the world, possessing substantial technical and financial resources. Like IBM, it receives most of its revenue from a relatively small number of large organizations.

Moreover, of all the world's communications companies, AT&T promises eventually to suffer the least from government interference in its management. The question arises, therefore, whether IBM will be able to dominate the all-important U.S. commercial communications market. Only by winning in the U.S. market can IBM hope to win the rest of the world.

IBM holds several advantages over AT&T. First, IBM alone has a strong worldwide presence, cultivated over the years with the world's largest companies. Only since it was divested of its Bell operating companies has AT&T started to market abroad — and that without much success.

> ***In striving to beat AT&T at home, IBM will likely appeal to its internationally active customers and develop computer and communications products that give it tremendous momentum in international telematics markets.***

Second, IBM gets about half of its revenue from large computer systems, split evenly between processors (with memory) and peripherals; both those areas seem secure against dwindling competition and will show increasing profits.

At least as important is the fact that IBM is also free of all governmental scrutiny, so it can change prices and marketing policies quickly.

Finally, IBM is still free to price discriminate across whatever market segments it chooses through interface manipulation.

In direct contrast, AT&T was divested of its operating companies precisely to prevent it from price discriminating and from denying competitors equal access to critical communications services, namely its vast network.

Though IBM relies heavily on both anticompetitive tactics, it has no obligation to defend itself in front of government regulators. AT&T must defend itself and will therefore be relatively incapacitated.

In striving to beat AT&T at home, IBM will likely appeal to its internationally active customers and develop computer and communications products that give it tremendous momentum in international telematics markets.

Only if AT&T and the PTTs can provide foreign businesses with function and performance at least comparable to that available from IBM can they stop IBM.

Cooperating in a hurry

To supply such products, of course, would require unprecedented cooperation between the PTTs in unifying their now-disparate networks as well as the ability to deliver products as quickly as IBM and its school of helpers can. Otherwise, customers will increasingly turn to IBM for connection of their IBM computer systems and for an increasing portion of their overall telecommunications needs. Any nation that resists may well lose more than it gains.

Already, it seems, PTTs have seen the handwriting on the wall and are competing with each other to make the best possible deal with IBM.

IBM has developed a national videotex system and an automatic telephone information service, called Audi, for the West German PTT. It is working closely with British Telecom. And with Japan's Nippon Telephone & Telegraph Public Corp. (NTT), it is building a value-added network for the Japanese market. It will likely attempt to install the same technology in other nations as well.

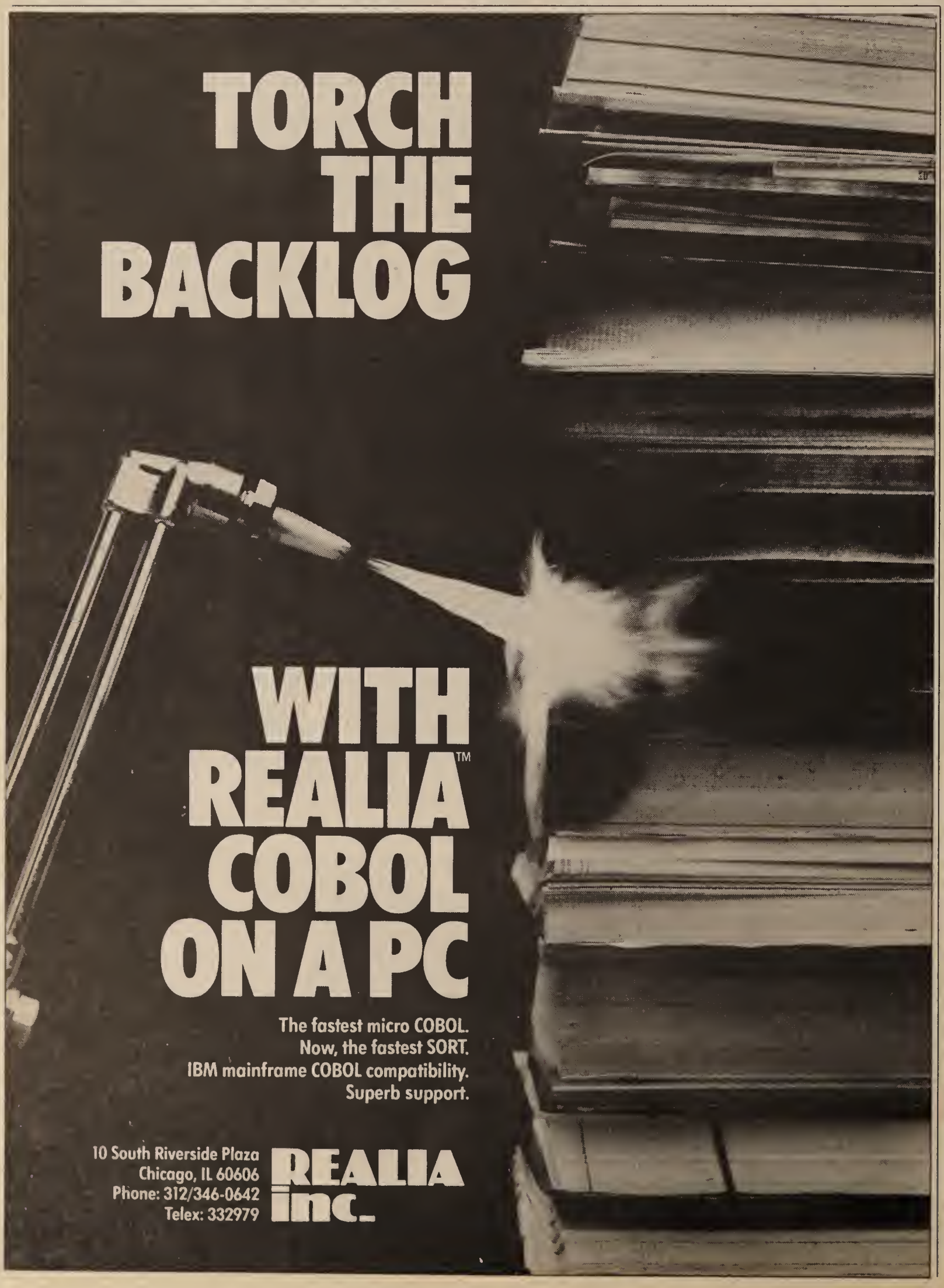
All the major computer and communications companies in Japan opposed the NTT deal before it went through — understandably, since they saw it forcing them to compete with a local telephone monopoly as well as with the world's computer monopoly. NTT, some predicted, would soon become a major sales agent for IBM.

Indeed, one wonders why NTT and the Japanese government agreed to such a deal. It appears that IBM got some help, however.

According to one informed observer, such a joint venture would have been unthinkable just a few years ago, but trade frictions between the U.S. and Japan were so bothersome in 1985 that the government resistance softened considerably.

The U.S. government, pressured by semiconductor and communications companies at home, lobbied in Japan to have NTT open its equipment procurements to non-Japanese companies in reciprocation for similar openness in the U.S. Significantly, when the door opened, IBM was the first in.

Thus is set a pattern we are likely to see repeated for years to come as Washington goes to bat for its own national champion, IBM. Meanwhile, the company is setting its sights on a broad range of other markets that depend directly on computers and communications. ■



MANAGEMENT

TAKING CHARGE
Alan E. Brill

Reality-based scheduling

Projects, I've noticed, tend to take longer than we think they ought to. Lately, I've been trying to figure out why that is, and I've made a breakthrough that I want to pass along to you.

I, like you, think I can estimate how long data processing projects ought to take. Then, based on experience, I add a correction factor to form my estimate. But that correction factor always bothered me, and I tried to determine why I needed it. The problem was that whenever I looked at the tasks in the project one at a time, my estimates seemed good. But somehow, put together, the time was insufficient. What could explain the difference?

I thought about it in the office. I thought about it at home. But the answer didn't come until I thought about it on vacation at Club Med. I realized, as I considered the matter over a pina colada, that while I was on vacation for that week I wasn't working on a project at the office. And I wasn't working on projects when there was a holiday, when I was sick, when I was in a training session or attending a convention or even when I was filling out my time sheet.

The problem, simply put, was that I had always managed under the assumption that if a project required 36 months of work, assigning three staffers to do it in a year would do the trick — assuming the tasks overlapped sufficiently. Of course, as we've all found

See **REALITY** page 67

Brill is Director of Computer Security Services for the New York City Department of Investigation.

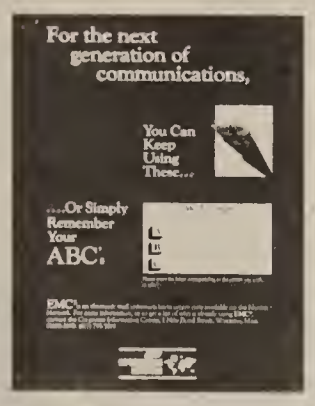
Norton markets its MIS

Unifying effort counters effect of decentralization

By David A. Ludlum

WORCESTER, Mass. — Coke or Pepsi it's not, but Norton Information Services (NIS), which runs the corporate information center for Norton Co., illustrates a growing emphasis on marketing to promote MIS services.

The marketing is aimed at drawing more clients to services from which information center managers feel the company will benefit, particularly in countering side effects of information systems decentralization.



Norton, with 18,000 employees in 27 countries and revenue of $1.2 billion last year, is itself a highly decentralized, far-flung operation, with 18 strategic business units worldwide producing grinding wheels, coated abrasives, ceramic products, oil, refined ores and other products.

The company's information systems, too, are thoroughly decentralized. Although there are corporate systems, run on an IBM 3083 and 4381 at its Worcester headquarters, there are no corporatewide software standards or controls on computer purchases.

One unifying function is the NIS corporate information center in Worcester, which was merged with an information center for Worcester-area operations one year ago.

NIS has promoted its services with flyers, posters, T-shirts and gifts, all emblazoned with the company logo. The organization also publishes a newsletter, runs articles in other internal publications, meets one-on-one with managers at all levels and makes group presentations.

The marketing effort is driven chiefly by competition from outside suppliers, according to Edward Gaudette, manager of

See **MIS** page 68

Development taps social science

By Donna Raimondi

REDONDO BEACH, Calif.— User engineering, a technology blending computer and social sciences, is shaking up traditional computer systems development methods at TRW, Inc.'s Defense Systems Group.

A TRW official says the technique gives end users what they really need instead of what they think they need, drastically reduces the life-cycle costs of systems and reduces the risk of building systems nobody wants to use.

"We are combining people who are sensitive to people with people who are sensitive to technology," says Larry McLaughlin, user engineering project director at the company's Systems Development Divison.

To build systems designed for users' work styles, McLaughlin's development teams use psychology, sociology and anthropology to identify users' work habits, learning methods and preferences. Then TRW builds prototype applications, which go through many iterations before being written in final code.

In the late 1970s and early 1980s, TRW built some U.S. Army and intelligence applications that were unacceptable to users, even though the company studied what the users wanted, had users approve specifications and built the systems to them.

"It was a failure of people to understand how they really work and what kinds of information they really needed. They didn't understand how their minds and their cognitive processes work and how their work styles really fit with some sort of automated information," McLaughlin says.

The five- or six-person user engineering teams, using human resource studies and consultants, determine where the power is

See **DEVELOPMENT** page 67

System break-ins raise concern over electronic terrorism

Unix users hit hardest in nationwide entries

By Jeffry Beeler

A recent rash of systems break-ins dramatizes anew the extreme vulnerability of virtually all processor architectures to electronic penetration, according to information security consultants.

The intrusions, which have occurred nationwide and chiefly involved large Unix users, have also rekindled fears among some experts that U.S. systems could someday fall prey to electronic terrorism, with devastating consequences.

Philadelphia-based security consultant Ian Murphy, for example, invokes images of skilled saboteurs who secretly invade a commercial system, write logic bombs or other deliberately destructive programs and conceal them in the user's software for later activation. With little trouble, the same procedure could be duplicated "all over corporate America," claimed Murphy, founder of IAM/Secure Data Systems, Inc.

Potential vulnerability

Murphy's colleagues agree with his thesis that many systems are potentially vulnerable to security breaches and could be disabled by an attacker with sufficient skill, persistence and ruthlessness. Although electronic terrorism may be technically feasible, it may be ineffective, according to SRI International, Inc. security consultant Donn Parker.

Unless it was exceptionally conspicuous, an act of electronic sabotage would yield little of the publicity and recognition terrorists often seek because the victim would do everything possible to keep the embarrassing attack a secret, Parker said. Thus, explosive bombs and other conventional terrorist tactics might be better suited to a political extremist's purposes than logic bombs.

The debate over whether electronic terrorism constitutes an immediate and serious threat was revived recently when yet another band of electronic intruders made U.S. systems sites the objects of unwanted attention.

Interlopers

Apparently armed with stolen access codes and phone numbers, the interlopers called and illicitly entered systems at Lawrence Berkeley Labs, MIT, Mitre Corp., Stanford University and the University of Illinois. Many of the penetrated systems contain data on nonclassified military and other government research.

At Stanford, the invaders did little more than rummage through files and create some fake accounts, said Lester Earnest, associate chairman of the university's computer science department. One of the accounts bore the password of "P. Floyd," which gave rise to the apocryphal theory that the intrusions were the work of a lone hacker nicknamed "Pink Floyd."

"No one ever called himself Pink Floyd," Earnest said. "In fact, the trouble wasn't the result of just one individual. It was caused by at least

See **SYSTEM** page 68

INSIDE

Calendar: selected conferences, exhibitions, seminars/**66**

INSTANT ANALYSIS

"You can't install a vision. You have to install specific projects in a step-by-step fashion."
— Louis B. Hughes, senior vice-president, information systems, Equitable Life Assurance Society of the United States

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3B2 XM. Expansion Module adds 23MB cartridge tape storage and/or 30 to 72MB hard disk storage.

3B15. Serves 16 to 60 users, 128 RS232C ports. Speed: 1.6 MIPS. Supports 8 drives, with maximum storage of 2.7 *giga*bytes.

Not shown: Other members of AT&T's 3B computer family serve up to 100 users, across a wide range of business needs and environmental conditions.

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systems—without forcing users to give up the applications they know and trust.

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You can start with the pieces you need to solve today's problem: linking mainframe and desktop, say; or pulling together a department. As your needs and ambitions change, so can your system. AT&T makes the pieces fit.

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CALENDAR

NOV. 30-DEC. 6

Engineering Workstations and the PC. Bedford, Mass., Dec. 1-3 — Contact: Institute for Graphic Communication, 375 Commonwealth Ave., Boston, Mass. 02115.

Optical Fiber Communications. Colorado Springs, Dec. 1-5 — Contact: Continuing Engineering Education, George Washington University, Washington, D.C. 20052.

Information Security: The Challenge. Monte Carlo, Dec. 2-4 — Contact: Marie-Martine Sainflou, Agence de l'Informatique, Tour Fiat-Cedex 16, Paris — La Defense, France.

MAP/TOP Courses. Boston, Dec. 2-4 — Contact: Ship Star Associates, Inc., 36 Woodhill Drive, Newark, Del. 19711. Also being held Dec. 18-19 in Atlanta, Jan. 12-16 in Phoenix, Feb. 19-20 in Orlando, Fla., and March 10-12 in Washington, D.C.

DEC: The Next Five Years. San Francisco, Dec. 3-4 — Contact: The Yankee Group, Seminar Division, 14th Floor, 89 Broad St., Boston, Mass. 02110.

Electronic Mail Industry Conference. Dec. 3-4, Washington, D.C. — Contact: EMA, Suite 300, 1919 Pennsylvania Ave. N.W., Washington, D.C. 20006.

Matrix Eight (The Graphic Communications Association's Annual Conference). Fort Lauderdale, Fla., Dec. 3-5 — Contact: Suite 604, 1730 N. Lynn St., Arlington, Va. 22209.

Long Range Information Systems Planning. Philadelphia, Dec. 3-6 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020. Also being held Dec. 8-11 in New York.

The 1986 Computerized Plan Administration Institute. Hollywood, Fla., Dec. 3-6 — Contact: Registrations Department, International Foundation, P.O. Box 69, Brookfield, Wis. 53008.

California Computer Show. Palo Alto, Calif., Dec. 4 — Contact: Norm De Nardi Enterprises, Suite 204, 289 S. San Antonio Road, Los Altos, Calif. 94022.

Software Rapid Prototyping. Dallas, Dec. 4-5 — Contact: EFDPMA Seminars, Dept. SRP, P.O. Box 3608, 3420 Kashiwa St., Torrance, Calif. 90510. Also being held Dec. 11-12 in Anaheim, Calif.

Strategic Planning and Information Systems. New York, Dec. 4-5 — Contact: New York University, School of Continuing Education, Seminar Center, 575 Madison Ave., New York, N.Y. 10022.

DECEMBER 7-13

Software Testing Management Workshops. Jacksonville, Fla., Dec. 7-12 — Contact: Software Quality Engineering, Suite 16, 3015 Hartley Road, Jacksonville, Fla. 32217. Also being held Feb. 15-20 in Orlando, Fla., and March 1-6 in San Diego.

Disaster Recovery/Contingency Planning Seminar. Cleveland, Dec. 8-9 — Contact: ISR Consultants International, Inc., Suite 103, 3455 Washington Drive, Eagan, Minn. 55122.

Financial Microcomputer Conference. Atlanta, Dec. 8-9 — Contact: Financial Managers Society, Inc., Suite 2221, 111 E. Wacker Drive, Chicago, Ill. 60601.

Applying Machine Vision to Electronic Component Assembly and Inspection. San Jose, Calif., Dec. 8-10 — Contact: SME Special Programs, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

The National Connectivity Symposium on Local Area Networks and Micro-Mainframe Links. Washington, D.C., Dec. 8-11 — Contact: Digital Consulting Associates, Inc., 6 Windsor St., Andover, Mass. 01810.

The IBM PC Data Communications Survival Course. Boston, Dec. 9 — Contact: Data-Tech Institute, P.O. Box 2429, Lakeview Plaza, Clifton, N.J. 07015.

The 4th Computer Symposium for Local Government. St. Cloud, Minn., Dec. 9-10 — Contact: Government Training Service, 202 Minnesota Building, 46 E. Fourth St., St. Paul, Minn. 55101.

How to Design and Implement Bar Code Systems. Clearwater Beach, Fla., Dec. 9-10 — Contact: Society of Manufacturing Engineers, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Managing and Motivating Computer Professionals. Chicago, Dec. 9-11 — Contact: Gary Slaughter Corp., 400 Fifth Ave. S., Naples, Fla. 33940.

Optical Information Systems '86 Conference. Arlington, Va., Dec. 9-11 — Contact: Conference Management Corp., 200 Connecticut Ave., Norwalk, Conn. 06854.

International Conference on Management and Performance Evaluation of Computer Systems. Las Vegas, Dec. 9-12 — Contact: Computer Measurement Group, 6397 Little River Tnpk., Alexandria, Va. 22312.

1986 CAUSE National Conference. Monterey, Calif., Dec. 9-12 — Contact: Professional Association for Computing and Information Technology in Higher Education, 737 29th St., Boulder, Colo. 80303.

Software Quality Control. Management Information System. Boston, Dec. 11 — Contact: International Datatek, 7 Carriage Drive, Acton, Mass. 01720.

ACE's Third Annual Computer Education Conference. New York, Dec. 13 — Contact: Association of Computer Educators, Inc., 751 Bard Ave., Staten Island, N.Y. 10310.

DECEMBER 14-20

Seventh Annual Data Training Conference and Exposition. Washington, D.C., Dec. 14-18 — Contact: Conference Registrar, Weingarten Publications, Inc., 38 Chauncy St., Boston, Mass. 02111.

Fostering Creativity and Innovation. (Satellite Broadcast) Dec. 15-19 — Contact: National Technology University, P.O. Box 700, Fort Collins, Colo. 80522.

Advanced Manufacturing Systems-West '87. Anaheim, Calif., Dec. 15-17 — Contact: John Frett or Bill Harrington, Cahners Exposition Group, P.O. Box 5060, 1350 E. Touhy Ave., Des Plaines, Ill. 60017.

Effective Management Skills for the MIS Manager. Chicago, Dec. 15-18 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Improving Your Internal Consulting Skills. Washington, D.C., Dec. 15-18 — Contact: American Management Association, 135 W. 50th St., New York, N.Y. 10020.

Dexpo East 86 Show and Microcomputer Graphics Show. New York, Dec. 17-19 — Contact: Expoconsul International, Inc., 3 Independence Way, Princeton, N.J. 08540.

JANUARY 4-10

Hawaii International Conference on System Sciences. Kailua-Kona, Hawaii, Jan. 6-9 — Contact: Center for Executive Development, College of Business Administration, University of Hawaii, B-101, 2404 Maile Way, Honolulu, Hawaii 96822.

Ten Unix Seminars. Fremont, Calif., Jan.7-10 — Contact: Uni-Ops, P.O. Box 27097, Concord, Calif. 94527.

JANUARY 11-17

Business Automation Forum. Fort Lauderdale, Fla., Jan. 11-14 — Contact: Recognition Technologies Users Association, P.O. Box 2016, Manchester Center, Vt. 05255.

Interfacing Sensors with the IBM PC. Madison, Wis., Jan. 12-14 — Contact: Department of Engineering Professional Development, University of Wisconsin at Madison, 432 N. Lake St., Madison, Wis. 53706.

Winter MAP/TOP Users Group Meeting. Phoenix, Jan. 13-14 — Contact: Society of Manufacturing Engineers, Technical Activities Division, P.O. Box 930, One SME Drive, Dearborn, Mich. 48121.

Computer Graphics '87. San Diego, Jan. 14-16 — Contact: Industry Representative, Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

The Society for Computer Simulation 1987 Multiconference. San Diego, Jan. 14-16 — Contact: SCS, P.O. Box 17900, San Diego, Calif. 92117.

Data Communications and Networking for the IBM PC XT/AT and Compatibles. New Brunswick, N.J., Jan. 15-16 — Contact: Software Institute of America, Inc., 8 Windsor St., Andover, Mass. 01810. Also being held Feb. 5-6 in Los Angeles and Feb. 19-20 in Chicago.

JANUARY 18-24

Pacific Telecommunications Council Ninth Annual Conference. Honolulu, Hawaii, Jan. 18-21 — Contact: Room 308, 1110 University Ave., Honolulu, Hawaii 96826.

Buscon-West. Los Angeles, Jan. 20-21 — Contact: The Bus/Board Users Show & Conference, No. 116, 17100 Norwalk Blvd., Cerritos, Calif. 90701.

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Reality-based scheduling

From page 63

out, it doesn't, because three people working for a year do not provide 36 months of work on project tasks.

Let's consider a typical working environment in a large company. Where is time lost from projects? Here are some places. You can add others that affect your company:

- Vacation: 15 work days.
- Illness: five work days.
- Holidays: 10 work days.
- Training: eight work days.
- "Administrivia": seven work days (that's one hour per week).

Subtotal: 45 work days (nine weeks).

Of the remaining 43 weeks, are there any data processing managers with more than 10 minutes' experience who believe that everyone is 100% devoted to project tasks? We have to add in a productivity factor. My gut feeling is that if we get 85% productive efficiency, we're doing well. That translates to an added loss of 6.45 weeks per year.

That gives us a total nonproject time of 15.45 weeks, which translates to a 30% loss. This leads to the somewhat depressing but true conclusion that in order to accomplish 12 months of project tasks, you have to obtain just more than 17 calendar months of staff time.

That, to me, was a staggering figure. I hadn't been adding that much to my estimates for what I thought of as a safety factor. Yet when I started to do so, projects started to come in on time. We didn't have the annual crises of projects falling behind because of vacations. And we didn't have managers pleading with employees to defer their vacations to finish various vitally important projects.

Since these days nothing seems to exist without a snappy name and acronym, I vote to adopt the name "Reality-Based Scheduling," or RBS, for this process.

And I want to propose you for membership in the Association of Reality-Based Schedulers.

There are no dues and no meetings. Your only obligation as a member is to calculate for your company what the various loss factors are in both time and efficiency. I suspect there may be industry norms that you should know about, and possibly regional norms.

If you will help me collect the data, I will calculate the averages and spreads and report them to you in *Computerworld*.

To participate in this self-help effort, just send me a copy of your calculations. You need not reveal your company, but please list your industry and location.

For time-loss factors, provide time estimates in days per year. For efficiency factors, provide your estimate in terms of percentage of available time devoted to actual project tasks. Please send your data to me at 108 Genesee Ave., Staten Island, N.Y. 10308.

The alternative to RBS is missed deadlines, aggravating crises and the feeling that you're not in control. By spreading the word on RBS, you'll help to ease the pressure and manage more effectively.

Development taps science

From page 63

in a user organization, what its informal working relationships are, how decisions are made and how information flows.

The approach McLaughlin developed includes four elements that he considers critical to success:

- The multidisciplinary team.
- A process that is creative rather than analytical or reductionist.
- A prototyping environment that simulates the user workplace, with the appropriate furniture, books and bookcases and lighting.
- A user interface management system, a prototyping tool that lets designers build prototype screens.

"We produced, in two months, a view of a bathymetric [water depth] data integration system that would have taken five or six times as many people a year to produce. And we might have never produced it on paper, because the ideation and creativity that go on in a small team just doesn't happen in a large paper-writing team," McLaughlin maintains.

In addition to the successful prototypes, user engineering teams have found that some applications turn out to be too costly to build. A map-making project prototype showed that using pencil and erasure processes on a light table was more cost-effective and reliable for a particular group of users than building a computer graphics system on workstations.

Understanding users' needs

Part of what makes this approach to computer engineering valuable comes in understanding that users have different needs, McLaughlin says. They might be analytical or intuitive, introverted or extroverted and have varying needs for structure and adaptability.

While not every system needs to be this finely tuned to users, critical decision-making aids should be, McLaughlin says.

"In a system in which a commander needs to make a decision in a certain length of time from information which may be greatly detailed in some areas, vague in others and conflicting in others . . . we need these techniques to provide the best decision-aiding," he says.

INTRODUCING

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INTELLECT/DB2 dramatically enhances your investment in DB2 by making it accessible to managers in plain English. INTELLECT/DB2 was developed by Artificial Intelligence Corporation, the pioneer in commercial AI technology and the creator of INTELLECT, the natural language software used by hundreds of organizations worldwide.

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2. AD HOC ANALYSIS
INTELLECT/DB2 enables managers to get answers to complex questions easily. Statistics such as totals, minimums, maximums and percentages, and complex functions including correlations and ratios need only be requested. Users see results displayed in summary form or graphs automatically.

3. APPLICATION BUILDING
INTELLECT/DB2 users can build personal applications in English. Within security constraints, users can create and update tables, build forms for data presentation, and request reports.

4. PROPER USE OF DB2
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MIS applies marketing

From page 63

end-user computing and office automation.

Users might go outside the firm for products and services because they see the services of outside vendors as faster and less expensive than NIS, Gaudette says.

"Often not thought of is that you don't get full understanding of how the company runs," he says. For example, the purchase of an apparently inexpensive data base may not look as good if the user later finds he wants to share data with fellow workers who use incompatible products, Gaudette remarks.

NIS's marketing has also been propelled by the reluctance of many to take the plunge into computing, according to Janice Smith, supervisor of the corporate information center. "There's still an enormous task in moving people into an electronic age," Smith says.

Top managers are a particular challenge even in areas appropriate for them, such as timely international communication, she says. "We have reluctant management. We're trying to bring them along the learning curve to where they really trust what they're seeing on their screen as accurate information."

Developments that Smith attributes in part to marketing efforts include the signing of 700 users for the corporate electronic mail system introduced in March and the expansion of NIS's two-day retreat for computer training, known as Computing, Awareness, Motivation and Perspectives (CAMP) [CW, July 28], to eight sessions this year from three last year.

The Norton managers do not have a dollar figure for the cost of their marketing efforts, but Gaudette says, "You're not talking about a whole lot of money." Smith, who started marketing information services while running the defunct Worcester-area information center, suggests the costs of not promoting the services far outweigh the costs of doing so.

> ***'There's still an enormous task in moving people into an electronic age.'***
>
> — Janice Smith
> Norton Information Services

The benefit of providing the corporate services, she says, is keeping information centralized and accurate.

"We have duplicated the MIS department in every strategic business unit and, in a lot of cases, we have duplicated systems so that the information is in more than one place," Smith says. "The cost of having it in a lot of different places and not even knowing that — you couldn't even estimate it."

System break-ins raise concern

From page 63

three," he added.

Murphy, who was once a pirate hacker known as Captain Zap before being arrested and convicted for fraudulently ordering merchandise by computer, views the recent break-ins as an attempt to expose Unix's glaring defects.

"Whoever is behind these incidents is definitely on a mission," he said. "He's telling people that, from a security standpoint, Unix is trash, and he's right. Unix is very functional and compact in its operation, but because it is an open architecture, its security is Swiss cheese."

So far, none of the intrusions have damaged the victims' data or programs. "These people just seem to be trying to demonstrate that they can log on to various systems," Earnest said. "From our standpoint, the security violations were a nonevent. Incidents of this sort happen dozens of times a year in an open environment like ours."

But if systems security is being violated by hackers who are comparatively benign, "we probably have to assume that some malicious ones are also doing the same thing," says Bob Campbell, president of Woodbridge, Va.-based Advanced Information Management, Inc.

To make matters worse, the threat is by no means restricted to systems running under Unix.

"Some of the individuals and groups that are breaking into systems these days are developing specialties," Campbell said. "A lot of the bulletin boards, for example, are carrying tutorials by people who are experts in getting into Digital Equipment Corp., Hewlett-Packard Co., Data General Corp., IBM, NCR Corp., you name it. The tutorials often go into a lot of detail about how to work your way through a system's protocols and reach an executive or supervisory state."

By using pirate bulletin boards and other techniques such as bugging and wire tapping, hackers have already acquired the necessary passwords and logons to enable them to cripple numerous corporate systems. Favorite targets include voice and electronic mail networks.

Typically, invasions begin with a lone intruder who scans the systems and posts key operational details on an underground bulletin board.

Although many user organizations have already been seriously harmed by breaches of information security, most companies still treat the problem with indifference, consultants say.

In general, the business community remains dangerously naive about the hacker subculture and its capacity for causing trouble, Murphy said. "Many businesses have absolutely no idea of what's going on with hackers and take the mistaken position that bad things always happen to the guy down the street, not to them personally," he said.

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Once the forgotten child, VM is becoming the "darling" of the IBM operating systems. Small wonder. With its flexibility, interactive qualities, and excellent host talents, it's the perfect answer to the needs of a growing number of companies. But with VM's versatility come questions—with five different variations to choose from.

This helpful booklet sorts through all the VM 'flavors,' telling you how to compare the available VM systems based on your current needs, your possible future needs, and your budget.

AREAS COVERED IN THE BOOKLET:

Defining Your Needs

The selection of a VM operating system variation depends greatly on your current and future needs, what applications you run.

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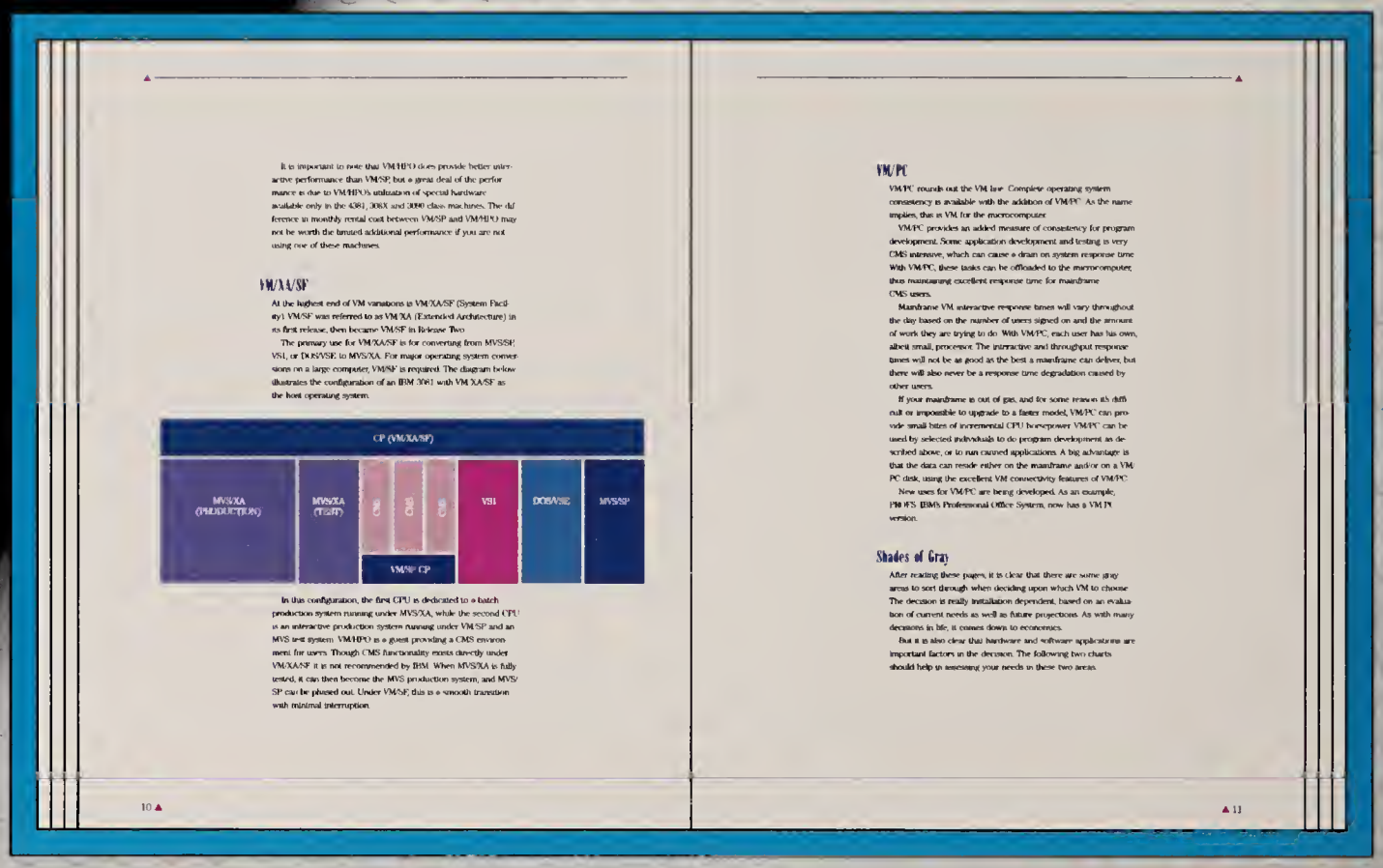

It is important to note that VM/HPO does provide better interactive performance than VM/SP, but a great deal of the performance is due to VM/HPO's utilization of special hardware available only in the 4381, 308X and 3090 class machines. The difference in monthly rental cost between VM/SP and VM/HPO may not be worth the limited additional performance if you are not using one of these machines.

VM/XA/SF

At the highest end of VM variations is VM/XA/SF (System Facility). VM/SF was referred to as VM/XA (Extended Architecture) in its first release, then became VM/SF in Release Two.

The primary use for VM/XA/SF is for converting from MVS/SF, VS1, or DOS/VSE to MVS/XA. For major operating system conversions on a large computer, VM/SF is required. The diagram below illustrates the configuration of an IBM 3061 with VM/XA/SF as the host operating system.

In this configuration, the first CPU is dedicated to a batch production system running under MVS/XA, while the second CPU is an interactive production system running under VM/SP and an MVS test system. VM/HPO is a guest providing a CMS environment for users. Though CMS functionality exists directly under VM/XA/SF it is not recommended by IBM. When MVS/XA is fully tested, it can then become the MVS production system, and MVS/SP can be phased out. Under VM/SF, this is a smooth transition with minimal interruption.

VM/PC

VM/PC rounds out the VM line. Complete operating system consistency is available with the addition of VM/PC. As the name implies, this is VM for the microcomputer.

VM/PC provides an added measure of consistency for program development. Some application development and testing is very CMS intensive, which can cause a drain on system response time. With VM/PC, these tasks can be offloaded to the microcomputer, thus maintaining excellent response time for mainframe CMS users.

Mainframe VM interactive response times will vary throughout the day based on the number of users signed on and the amount of work they are trying to do. With VM/PC, each user has his own, albeit small, processor. The interactive and throughput response times will not be as good as the best a mainframe can deliver, but there will also never be a response time degradation caused by other users.

If your mainframe is out of gas, and for some reason it's difficult or impossible to upgrade to a faster model, VM/PC can provide small bites of incremental CPU horsepower. VM/PC can be used by selected individuals to do program development as described above, or to run canned applications. A big advantage is that the data can reside either on the mainframe and/or on a VM/PC disk, using the excellent VM connectivity features of VM/PC.

New uses for VM/PC are being developed. As an example, PROFS, IBM's Professional Office System, now has a VM/PC version.

Shades of Gray

After reading these pages, it is clear that there are some gray areas to sort through when deciding upon which VM to choose. The decision is really installation dependent, based on an evaluation of current needs as well as future projections. As with many decisions in life, it comes down to economics.

But it is also clear that hardware and software applications are important factors in the decision. The following two charts should help in assessing your needs in these two areas.

The Different VM Operating System Variations

A basic primer on the five basic VM variations now available: VM/Integrated System, VM/SP-System Base, VM/XA/SF, VM /HPO, and VM/PC...including all their advantages and disadvantages, machine requirements, and cost considerations.

Matching The VM System To Your Hardware

VM System variations all differ in the processors they can use...and the printers and other hardware they can support. This booklet gives you the guidelines to get the perfect system for your machine...or vice versa.

The Use of Guest Systems

VM is the perfect host for other operating systems such as DOS and/or MVS. (It's also the perfect referee when you use the two systems together.) This booklet suggests system variation guidelines if you need to use more than one system...and which VM combination can best meet your needs.

Financial Considerations

Apart from other considerations, it's important that the VM system chosen meets your budget. This booklet helps you through the budgetary process, and takes into account the cost of systems, processors, personnel, and support hardware.

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VM Software, Inc. is the leading developer of system software products for all variations of the VM environment. The chances are very good that if you run, or plan to run, VM, you'll eventually purchase at least one of our products to enhance it. So it's in both of our best interests that you select the right VM variation from the start.

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About VM Software, Inc.

VM Software, Inc. develops and markets system software for IBM and compatible mainframes running under the VM operating system. With eleven products in over 8,000 installations, VM Software is recognized as the leader in the VM marketplace.

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NEW PRODUCTS

Sytek's LAN makes room for the MAP

Sytek, Inc. of Mountain View, Calif., has introduced a high-band version of its System 2000 broadband local-area network, which can coexist on the same cable with a network supporting the Manufacturing Automation Protocol (MAP).

The System 2000 Highband is a modem board option for existing products that makes the future inclusion of MAP channels possible.

Previously, broadband channels allocated for the System 2000 overlapped with MAP channels. According to a company spokesman, System 2000 Highband can also share a broadband cable with the original low-band system, doubling the number of available transmission channels from 60 to approximately 120.

The System 2000 Highband family includes the 2502 Highband Packet Communications Unit (PCU), priced at $1,195; the 2532 Highband Multiplexer PCU for $4,400; the Highband Network Translator for $3,000; and the 2555 Translator Switch for highband or lowband, priced at $4,000.

Other System 2000 products unveiled by Sytek include the following:

- The 2602 High-Performance PCU, priced at $1,295, and the High-Performance Interface Card, which costs $695. Together, the products increase total network throughput from 19.2K to 38.4K bit/sec., enabling it to support high-speed applications such as graphics.
- The 5202 Network Bridge/Link Unit, for $9,000, connects channels within the System 2000 network and performs automatic routing and traffic balancing.
- The 5102 Statistical Monitor, for $2,075, collects network performance data and generates reports.
- Protocol Transparent Units (PTU) create a dedicated channel for connecting any set of compatible synchronous or asynchronous terminals and hosts. The 1301 PTU, for $995, operates at 38.4K bit/sec. and supports RS232 ports; the 1302 PTU, priced at $1,595, operates at 64K bit/sec. and uses an RS422 interface.

Firm upgrades VSAM tools

Software enhancements geared toward IBM MVS

Softworks, Inc. of Clinton, Md., has enhanced two of its VSAM support software products for IBM MVS systems.

The VSAM Space Manager is a direct-access storage device (DASD) space management utility. It is said to provide a volume pooling facility for VSAM catalogs. It can designate pools of DASD volumes available to particular VSAM catalogs for allocation of data sets. When defining a VSAM data set by means of IDCAMS, the user can specify any volume. VSAM Space Manager will find the space needed from among the appropriate volumes, the vendor said.

The pooling facility also allows the installation to add and remove DASD volumes without impacting production JCL streams that allocate or reallocate space.

The Space Manager can also be used to limit the number of catalogs using a volume in an ICF environment and can reserve a cushion of space on volumes to ensure adequate space for secondary allocations. It allows specification of multiple volumes, components on different volumes and allocation of VSAM data sets, data spaces and catalogs by absolute track for performance enhancement.

A VSAM Space Manager site license costs $13,425.

The VSAM Mechanic consists of a set of utility programs said to allow the installation to back up, restore, recover, analyze and repair VSAM/ICF catalogs and VSAM data sets. It provides facilities to back up catalogs in a format that allows them to be restored with different data set names, to different volumes and on different device types.

Additional features include facilities to synchronize time stamps, print VSAM records, indexes and control intervals, delete orphaned data sets and rebuild catalog-free record chains.

VSAM Mechanic is licensed by site for $7,950.

Softworks also announced the availability of the VSAM Performance Series (VPS), consisting of VSAM utility software.

According to the vendor, VPS can reduce allocated VSAM DASD space. Features allow users to convert to new catalogs and device types with global commands and eliminate the need to manually find VSAM space on DASD volumes. Facilities are available to back up, restore and repair damaged VSAM/ICF catalogs and data sets. VPS operates with all MVS systems, the vendor said. Site licenses range from $6,500 to $35,000 depending on the options chosen.

TI adds Explorer configurations

Texas Instruments, Inc. of Dallas has announced new system configurations of its Explorer, which is a symbolic processing workstation based on 182M-byte disk drives.

According to a company spokesman, the 182M-byte disk, based on Winchester technology, is said to provide nearly 30% greater mass storage capacity than previous Explorer models.

Up to eight of the 5¼-in. disks can be supported by an Explorer. The average seek time is 16.5 msec, with a transfer rate of 10M bit/sec.

The 182M-byte disk drive is also available as a system option that can be added to existing Explorer installations with an adapter cable.

The Explorer systems based on the 182M-byte disks are priced from $39,000 to $69,250. The 182M-byte mass storage options for existing Explorers are priced from $8,500.

The Explorer symbolic processing workstation is used for development and delivery of artificial intelligence applications, such as knowledge-based systems and software prototyping and development. The Explorer is also used for research in artificial intelligence and other advanced computing technologies, according to the vendor.

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SOFTWARE & SERVICES

Systems Software

Specialized Software, Inc. has announced **Tables2**, an enhanced version of its Tables/DL1 table management product.

Tables2 is said be a general purpose multifunction applications development system for designing and maintaining on-line programs using IBM's IMS-DB and DB2 and Tables/DL1 within the IMS/DC framework.

The on-line system features a screen program generator, screen processor, table manager, DB2 interface and DB/DC dictionary interface.

The screen program generator of Tables2 can be licensed for $29,500.

Specialized Software, Suite 403, 90 Madison St., Worcester, Mass. 01608.

■

Westmoreland Software International, Inc. has released **Version 6.4** of its **ADD System** for the IBM System/34 and 36.

The ADD System is said to generate RPG source code and documentation for reports, on-line inquiries, file maintenance programs and batch programs.

Version 6.4 includes a report writer language designed for nonprogrammers. Other enhancements include the ability to preserve modifications to RPG source code; access to screen attributes for fields; and enhanced manuals.

The ADD System is available for $131 per month for a three-year lease.

Westmoreland Software, Suite 195, 853 E. Samoran Blvd., Casselberry, Fla. 32707.

Applications packages

The Bridge, Inc. has enhanced its **Trak** project management software for IBM and compatible mainframe users.

Trak 3.0 is said to operate with IBM's CICS or TSO. Additional features include a file of the employee's active tasks and a fill-in-the-blank time entry process; the ability to enter machine time, travel costs and supplies at the task level; summarize on-line or via reports; assign up to five users to one task; and share and allocate project costs with to up to five departments. Projects and employees can be moved to other departments using the product.

Trak 3.0 is priced from $12,500, with lease terms starting at $480 per month.

The Bridge, 199 California Drive, Millbrae, Calif. 94030.

■

MCBA, Inc. has introduced its **accounting and distribution software** for the AT&T 3B family of computers.

The packages are written in RM/Cobol and run under AT&T Unix System V.

Software packages include Accounts Payable, Accounts Receivable, Bill of Material Processor, Customer Order Processing, General Ledger, Inventory Management, Payroll, Purchase Order and Receiving, Master Scheduling and Material Requirements Planning.

The packages are priced from $1,500 to $3,000 for object code only and $2,000 to $6,000 for source code, the vendor said.

MCBA, 425 W. Broadway, Glendale, Calif. 91204.

Utilities

Help/38 Systems has upgraded its **RPG V** coding system for the IBM System/38.

New features include the ability to generate work field names and definition, a tutorial program that teaches the programmer both RPG III and RPG V and seven new source-entry utility line commands, including a notepad enhancement and a function to make documentation easier.

RPG V is priced at $995 per CPU.

Help/38, 210 Baker Technology Plaza, 6101 Baker Road, Minnetonka, Minn. 55345.

MICROCOMPUTERS

Software applications packages

Vertical Business Software, Inc. has announced the **VBSI Manufacturer**, the **Manufacturer with Process Control** and the **Garment Manufacturer**.

The VBSI Manufacturer includes accounts receivable, inventory control, purchasing and billing and up to 10 levels of inventory, with the number of inventory items limited only by the size of the disk.

The Manufacturer with Process Control adds the ability to track production through the various stages, and the Garment Manufacturer adds the ability to track items by size and color, provides cutting tickets and maintains two sets of receivables.

The programs run on the IBM Personal Computer XT. Manufacturer costs $1,500, Manufacturer with Process Control costs $2,000 and Garment Manufacturer costs $2,500.

Vertical Business Software, 662 Main St., New Rochelle, N.Y. 10801.

CORRECTIONS

Intex Solutions, Inc.'s XYZ:-Spread [CW, Oct. 20, page 103] costs $145 for a 12-worksheet version.

Travtech, Inc.'s Traps software system [CW, Oct. 27, page 88] uses an IBM Personal Computer for keystroke capture, editing and storage of test cases.

+1/3

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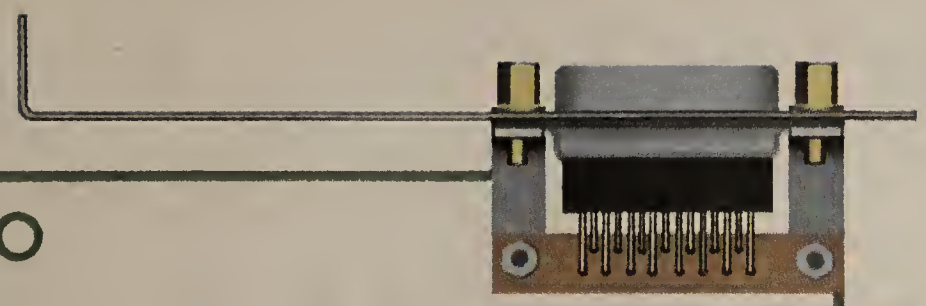
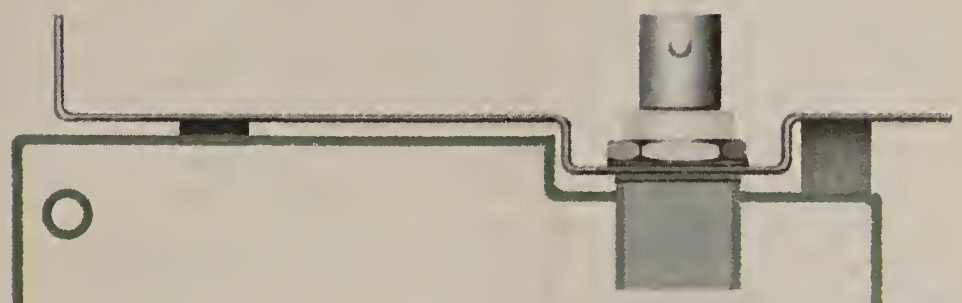


Introducing IBM's smarter, snazzier, worldlier 5250 emulation adapter.

The IBM *Enhanced* 5250 Emulation Adapter lets you connect your IBM Personal Computer to a System/34/36/38. But that's only the start of it.

The Adapter's emulation software has been enhanced to allow for some remarkable new feats.

- It's smarter. Now you can run two System/34/36/38 sessions plus one PC program simultaneously (switching between them all just takes a simple hot key sequence).
- It's snazzier. If your PC has a color monitor, now you can use the Adapter to interact with your system's Business Graphics Utility Program and print your session on the system's plotter.
- It's worldlier. If your PC has a modem and an SDLC adapter, now you can use the Remote Emulation Program to interact with a System/36/38 most anywhere in the world.
- It's more flexible. Now you can have the choice of printing on your system's printer or on a variety of IBM and non-IBM PC printers.
- It's more memorable. Now you can have concurrent access to your PC fixed disk while you're still in a system session.
- And it lets you do more, a lot more. Including electronic mail, document distribution, and other functions available with IBM's office applications.



Introducing IBM's smaller, smarter, faster 3278/79 emulation adapter.

The IBM *Advanced* 3278/79 Emulation Adapter lets you connect your IBM PC to a System/4300/3081/3083/3090. But that's only the start of it.

The Adapter card has been made smaller to fit a short slot, the price has been reduced to $595;* the IBM PC memory requirement begins at under 21 Kb, and the Adapter's emulation software is now an expanded family of software with some remarkable new abilities.

- It's smarter. The emulation software can let your IBM PC act as the mainframe gateway for an IBM PC Local Area Network.
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- It's more flexible. Now you can redefine the keyboard. Plus, you have the choice of printing on a 3270 Control Unit printer or on a variety of IBM and non-IBM PC printers. (You can even print out data from a host session on your PC printer while you're looking at data from a separate host session on your PC monitor.)
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NEW PRODUCTS/MICROCOMPUTERS

Autodesk, Inc. has announced **Autosketch**, a precision drawing package for IBM Personal Computers.

Autosketch is said to offer text placement, editing, automatic linear dimensioning and scaling capabilities as well as a variety of drawing aids. It utilizes a mouse and pull-down menus.

According to the vendor, drawings can be stored for use in other diagrams or can be converted into DXF format and entered into Autocad Version 2.5.

Graphic options include a Hercules Computer Technology, Inc. Graphics Card, IBM Enhanced Graphics Display or IBM Color Graphics Adapter operating in monochrome mode.

Autosketch is priced at $79.95.

Autodesk, 2320 Marinship Way, Sausalito, Calif. 94965.

Structural Management Systems, Inc. has announced the **Parameter Manager**, a desktop analysis product for the Apple Computer, Inc. Macintosh.

The software is said to allow users to collect, store, analyze and report the condition of time-, date- or sample-based data. It can trend, forecast and compare data using built-in functions. The data base can contain any number of items, and each item can have up to 64 variables.

Parameter Manager costs $495.

Structural Management Systems, 651 River Oaks Pkwy., San Jose, Calif. 95134.

Software utilities

Dynapro Systems, Inc. has announced **Chronos**, a real-time multitasking operating system for the IBM Personal Computer XT and AT.

Chronos, written in assembly, is said to include an on-line symbolic debugger; a re-entrant window manager for viewing up to 64 tasks at once; device drivers for keyboard, sound generator, parallel printer, serial printer, remote console, touchscreen and mouse; language interface for assembler, C and Fortran; and kernel with 57 system services.

Chronos is priced at $1,995.

Dynapro Systems, 1000-1200 W. 73rd Ave., Vancouver, B.C., Canada V6P6G5.

■

Ken Orr & Associates, Inc. has announced **Brackets**, an interactive diagramming system for the automatic generation of its Warnier/Orr diagrams.

Brackets runs on IBM Personal Computers and compatibles. Diagramming functions include creating Warnier/Orr diagrams; hiding and showing sets; modifying diagrams; saving, loading, and printing files; and generating ANSI-standard Cobol procedure code.

Brackets costs $695.

Ken Orr & Associates, 1725 Gage Blvd., Topeka, Kan. 66604.

COMMUNICATIONS

Software

Cleo Software has ported its **3780 Plus** Unix-to-mainframe communications software to the IBM RT Personal Computer.

The software is said to enable the RT's AIX operating system to talk directly to mainframe computers via 2780 or 3780 Binary Synchronous Control protocols.

3780 Plus for the IBM RT costs $1,195, including the software Syncable and user's manual. Optional 201 and 208 autodial modems are also available.

Cleo Software, 1639 N. Alpine Road, Rockford, Ill. 61107.

■

Winterhalter, Inc. has announced **Datasync 3270**, an IBM 3270 emulation product.

The product is said to combine the vendor's Datatalker 3270 Systems Network Architecture software with the Universal Data Systems, Inc. Sync-up modem board. The Datasync 3270 features a menu-driven interface for autodialing, 20 multiple sessions and high-speed file transfer for communications management system.

The Datasync 3270 costs $1,595 for 2,400 bit/sec. data transfer and $2,195 for 4.8K bit/sec. transfer.

Winterhalter, 3853 Research Park Drive, Ann Arbor, Mich. 48104.

■

Tekelec has announced the **TE821C Muldem**, an option for its TE820A Frame Simulator/Analyzer.

The Muldem is said to allow users to analyze T1C data by demultiplexing a T1C line into two T1 lines and multiplexing two T1 lines into a T1C line. The option simulates and analyzes bipolar violations and allows testing of live data from telecommunications equipment.

The stand-alone unit has its own power supply. It is priced at $4,250.

Tekelec, 26540 Agoura Road, Calabasas, Calif. 91302.

■

Racal-Vadic, Inc. has introduced the **VA4891** synchronous 4.8K bit/sec. rack-mount modem.

The modem was designed for use with the vendor's MDS-II network management system in two-wire dial-up or four-wire leased-line applications, according to the vendor.

It is AT&T 208 and V.27 compatible, provides synchronous autodialing and utilizes the capabiltiies of the MDS-II system controller, including monitoring and reporting of telephone line impairments.

The VA4891 modem is priced at $1,395.

Racal-Vadic, 1525 McCarthy Blvd., Milpitas, Calif. 95035.

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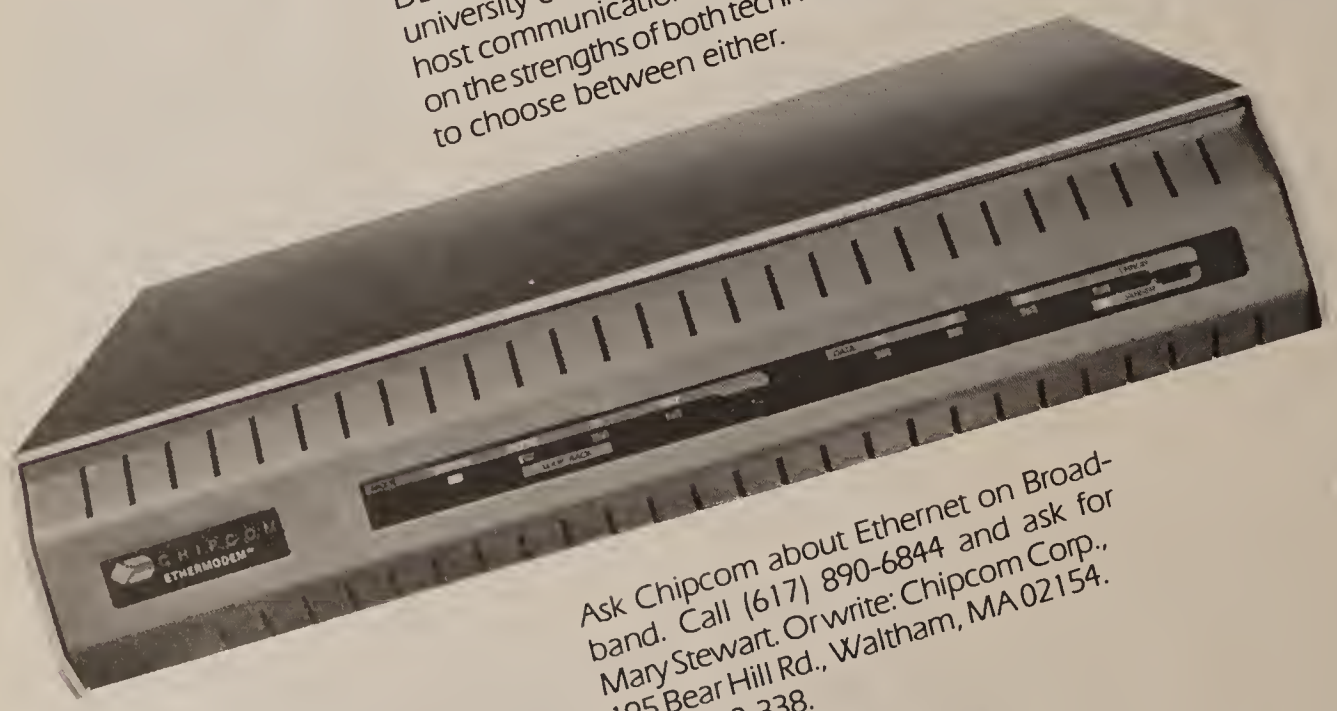

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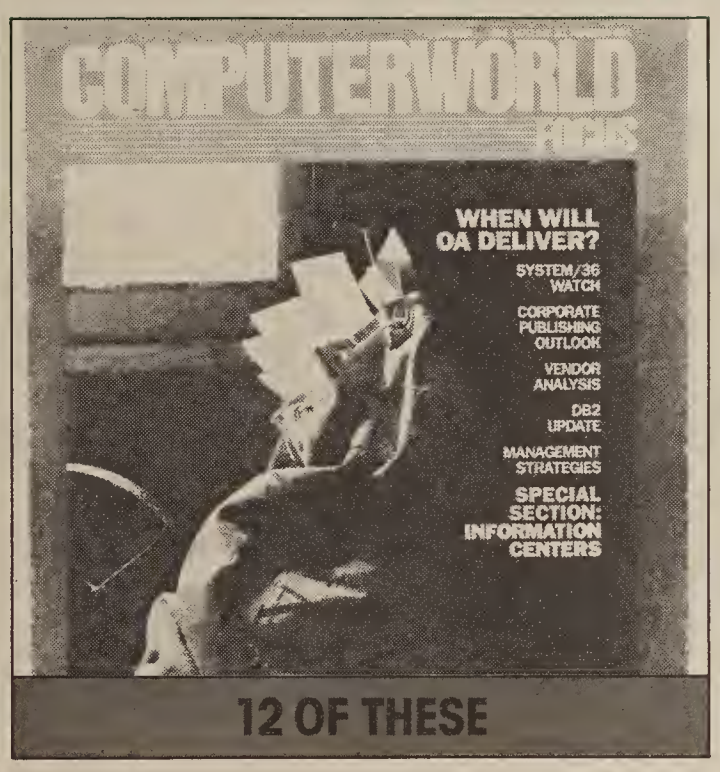

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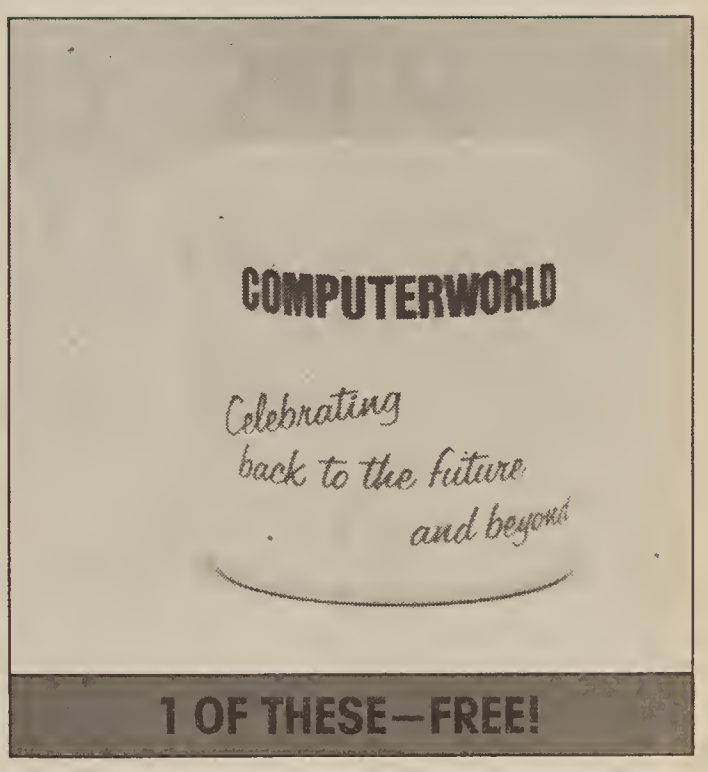

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COMPUTERWORLD

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SYSTEMS & PERIPHERALS

Turnkey systems

Image Management Systems, Inc. has announced the **Office Archiver 2000**, an archival system for Wang Laboratories, Inc. VS users.

The Office Archiver 2000 is said to use laser optical disk technology and applications software to enable the user to store up to 1G byte of word processing or data processing information on a laser disk without involving a dedicated I/O processor disk drive port.

The system connects to a Wang VS via a standard Wang workstation interface. The software is menu driven.

The Office Archiver 2000 system costs $47,500 and comes complete with one tabletop or rack-mount front-loading laser drive, laser platter, interface hardware and software.

Image Management Systems, One Richmond Sq., Providence, R.I. 02906.

■

IMI Systems, Inc. has announced a turnkey version of its **Warehouse Management Software** (WMS) for the Digital Equipment Corp. Microvax.

The menu-driven Microvax package includes modules that handle shipping, storage, retrieval and replenishment. It provides extensive report generation, quality control and security features and supports bar code scanners as well as printers, laser scanner, radio links, interfaces to mainframes and portable data entry systems.

The turnkey system including hardware, software installation and support costs $99,500.

IMI Systems, 1500 Broadway, New York, N.Y. 10036.

Graphics systems

Tektronix, Inc. has added the **SF4208** industrial color graphics terminal for manufacturing environments to its 4200 series of terminals.

The terminal is said to feature a sealed keyboard and filtered cooling airflow system for protection from air pollutants, dirt and spills. It also features a bar code reader.

The terminal has a 13-in. screen and provides a pixel resolution of 640 by 480.

It offers 16 displayable colors from a palette of 64, and system memory is 512K bytes, expandable to 1.5M bytes.

The SF4208 is priced at $5,495.

Tektronix, P.O. Box 15273, Portland, Ore. 97215.

Data storage

Media Systems Technology, Inc. has introduced a **cartridge tape duplication system.**

The system is said to be able to simultaneously copy up to seven 60M-byte, ¼-in. streaming tape cartridges. It was designed for standard ¼-in. cartridges using the QIC-24 recording format.

A typical 60M-byte tape with one file copies in about 12 minutes, and a system with seven tape copiers achieves a throughput of about 35 copies an hour, according to the vendor.

The modular system consists of the Model TC-2560 control unit for $9,650, including a processor, memory, control software and a master tape drive and from one to four duplicator drive units.

A typical system with four copy drives costs $35,150.

Media Systems Technology, 16812 Hale Ave., Irvine, Calif. 92714.

Auxiliary equipment

Victory Enterprises Technology, Inc. has enhanced its **Victory** disk duplication system with a communciations link said to enable computers to transfer data from a 3½-, 5¼- or 8-in. diskette to another computer, or vice versa.

According to the vendor, the system will read most disk formats and transmit data to a local or remote computer and can receive data from another computer and write it in most disk formats as specified by the operator. Two diskettes with different formats can be sent or received simultaneously.

The system is operated from an attached personal computer or ASCII terminal. It transmits data at 300 to 19.2K bit/sec. via an asynchronous link. Prices start at $3,620.

Victory Enterprises, Suite B2, 8910 Research Blvd., Austin, Texas 78758.

PRICE REDUCTIONS

Burr-Brown Corp. has annoucned price reductions for its **TM900 Transaction Processors**.

The TM900 is said to be an intelligent transaction processing system that can control up to 128 microterminals. It interfaces to a single communications port on the host computer.

Base prices now range from $3,995 to $5,795, depending on input configurations.

Burr-Brown, P.O. Box 11400, Tucson, Ariz. 85734.

■

Ziyad, Inc. has announced price reductions for some of its **laser printer feeder** models.

The Paperjet 400 for the Hewlett-Packard Co. Laserjet and Laserjet Plus and Canon U.S.A. LBP A-1 and A-2 laser printers now costs $1,495. The DSF-8 feeder for the Wang Laboratories, Inc. LPS8 Laser Printer now costs $1,695.

Ziyad, 100 Ford Road, Denville, N.J. 07834.

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Other utilities available include Lattice Sort/Merge (LSM™), $250; Source Entry Utility (SEU), $250; RPG/SEU/LSM combination, $1100; Screen Design Aid (SDA), $350.

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COMPUTER INDUSTRY

Section begins on page 102

Comshare's journey from time sharing to software pays off

Rebounds by carving DSS niche, reorienting

By Clinton Wilder

ANN ARBOR, Mich. — In an industry in which technology changes quickly and user needs change even faster, a software and services vendor faces a major challenge to change accordingly. Comshare, Inc. is trying to meet that challenge, but it has not been easy.

Founded in 1966 as a computer time-sharing provider, Comshare was just in time to cash in on the time-share bonanza of the 1970s. When that market evaporated as more large corporate users brought their data processing in-house, Comshare's fortunes also dried up.

While annual revenue stagnated near $65 million in the 1980s, profits shrank steadily until Comshare slipped below break-even. Its work force was trimmed from a peak of 1,300 in 1980 to 925, and its bottom line plummeted from a $4.5 million profit in fiscal 1980 to a $379,000 loss in 1985.

But by then, Comshare had begun a long-overdue transition to become a completely new entity: a software vendor. In its most recent quarter ended Sept. 30, Comshare's revenue from software products and professional services surpassed its time-sharing revenue for the first time.

"I had been waiting for four years for that to happen," says Richard Crandall, Comshare's founder, president and chief executive officer. Comshare's profit of $502,500, or 18 cents per share, during the quarter puts it well on the way in fiscal 1987 to exceeding earnings of $1.3 million, or 48 cents per share, in the fiscal year ended June 30, 1986.

Comshare's Crandall

Comshare has made the transition back to profitability with a time-honored formula: carving out a niche. Comshare's concept is one of executive workstation software, which includes a decision-support system (DSS), System W, and a 1-year-old executive information system (EIS), Commander. Both run under IBM MVS and VM with links to the IBM Personal Computer AT or XT.

Although Comshare had been in the computer business for some 15 years, the development and marketing of System W in the early 1980s required nothing less than a complete reorientation of the company.

"If we were going to bust into the software business, we couldn't do it with a me-too offering from our time-share applications," Crandall says. "We had to learn how to be a software company. That included turning over a lot of our sales force. For years it had been largely consultative, unlike the six-gun sellers we were up against in the software market."

Comshare got what appeared to be a big break in 1984 when it signed a two-year marketing agreement with IBM. Although IBM did not sell System W directly, the pact permitted Comshare and IBM sales representatives to make calls together.

"It was very healthy for Comshare in terms of market awareness, and we learned a lot about hooking into the SQL and DB2 worlds," Crandall says.

Some observers, however, contend that results from the IBM deal fell short of Comshare's expectations. Tom Lawton, publisher of the "Computer Services Report" in Belmont, Mass., says the overall market for DSS products has been disappointing, even with a helping hand from IBM.

"Everyone seemed to think that executives will sit there pushing buttons, but it's a tough sell," Lawton says. "Comshare was one of the many victims of the IBM mystique, thinking the agreement would do an awful lot for them. But the whole decision-support market is not bearing the fruit that the forecasts expected."

Comshare remains confident, however, seeking an edge for increasingly user-friendly EIS software. "Executives don't want to read documentation, learn command sequences, spend more than five minutes training or use a mouse," Crandall says. "The system has to be about as easy to use as a stove."

Comshare hopes to enhance its microcomputer connections through an agreement with its newest partner, Ashton-Tate [CW, Aug. 4]. The firms are jointly marketing a version of Comshare's W/Information Gateway micro-to-mainframe link that allows file exchange between System W and Ashton-Tate's Dbase series.

"To us, the PC is a business professional's workstation," Crandall says. "By and large, mainframe software vendors have been terrible at tapping the micro software market. Now we're trying to catch the second wave. As the market begins to realize that PCs have to get at the mainframe data, you'll see a shift back to the mainframe providers."

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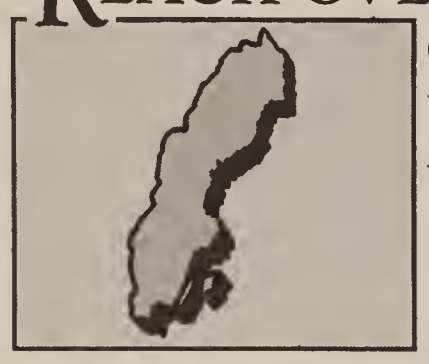

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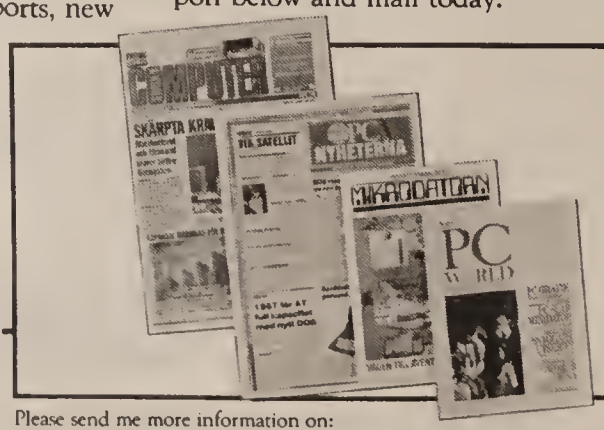

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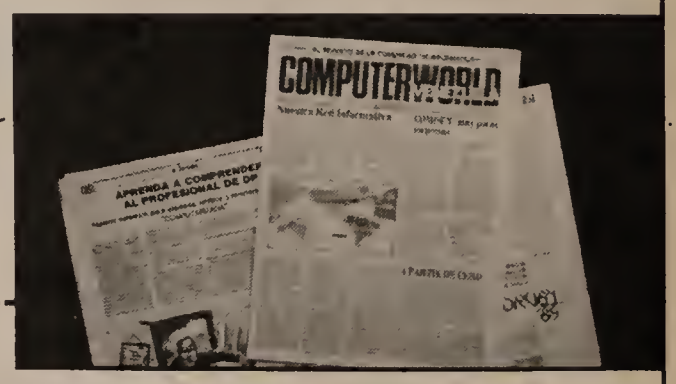

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With a future so promising and dynamic, it's no wonder up-and-comers like Dean Redfern find Information Services so attractive.

Dean has always had the inside track in the world of computers. The son of a DP manager, he began programming in COBOL and Fortran at the age of 12. At 23, McCormack & Dodge, Dun & Bradstreet's software development company, hired him from his formal training at Hartford's Computer Processing Institute before he could even finish.

His philosophy was quite simple, even in his earliest days. Not one to live by others' rules, he vowed to employ any tactic, embrace any product, use any technology, as long as it got the job done.

Several years ago, for instance, he was forced to move his entire IS/DP department across town. IBM told him the job would require at least a week of downtime. And that was all the challenge Dean needed. He rented rooms for his staff for a weekend at a nearby hotel, and accomplished the task between business hours Friday to Monday. Every one of his 700 terminals was up and productive Monday morning.

In 1984, Dean designed and implemented a nationwide SNA network so all 12 U.S. offices could demonstrate McCormack & Dodge's mainframe software on site. That move contributed significantly to a 50% revenue growth in the following year.

Today, Dean is responsible for a staff of 150, and a budget of nearly $15 million a year—a good part of which goes to purchase the 300 micros (and attendant peripherals) he installs every year. And he reports directly to the CEO.

Dean is also an avid road racer—he runs some 60 miles a week—an active member of the BMW Car Club of America, and a world traveler.

As you can imagine, Dean's a busy man. But if you really want to reach him, you can.

In Computerworld.

He's been reading it since he was 15 when he had to borrow his father's issue. And he reads it cover-to-cover, with his first cup of coffee. He claims it's helped him see the whole information services picture. Get a more global perspective. Spot the trends early and make the right decisions.

As young and accomplished as Dean is, he's by no means alone in his success. Information Services is a young industry. Full of individuals with individual visions. Yet they all seem to have one common insight.

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Bomb rocks German IBM research center

By Amiel Kornel

HEIDELBERG, West Germany — Terrorists exploded a bomb in the early morning of Sunday, Nov. 16 at IBM's European Networking Center here, causing no injuries but shattering windows and damaging a mainframe computer.

The Red Army Faction claimed responsibility for the attack in an eight-page letter left at the front of the building.

The letter denounced IBM's cooperation with West German universities as well as the firm's role as a major economic force in the country, according to an IBM spokeswoman in Stuttgart, West Germany.

"It could have happened to Siemens AG or anybody else," she asserted, adding, however, that "they were well informed about what goes on at the Heidelberg center."

The center, created in July 1985, is a focal point for IBM development work related to the International Standards Organization's Open Systems Interconnect standards.

The bomb, which exploded at 4 a.m., caused at least $1.47 million in damages, according to a spokesman at the West German Federal Attorney General's office. Part of the center's mainframe was hit, the IBM spokeswoman said, adding, "But it still works."

Two local priests received warning phone calls, permitting evacuation of the IBM premises before the explosion. The building, located in a residential neighborhood, has only minimal security.

The attack was the most recent in a series targeting West German computing centers and research facilities.

Kornel is European bureau chief for the CW Communications International News Service.

Pansophic's acquisition binge continues

By Clinton Wilder

OAK BROOK, Ill. — Continuing its flurry of acquisitions, Pansophic Systems, Inc. recently announced its intent to purchase a developer of IBM System/38 software applications and the graphics division of a vendor of turnkey, computer-aided slide-making systems.

The acquisitions will continue Pansophic's diversification away from the IBM mainframe-based systems software market.

Pansophic will pay $19 million in cash for Professional Computer Services, Inc. (PCR), an 11-year-old, privately held vendor of System/38 applications based in neighboring Oak Brook Terrace, Ill.

PCR's product line includes manufacturing, distribution, accounting and personnel programs.

Separately, Pansophic also agreed to pay approximately $2.5 million for the graphics divsion of AVL, Inc. of Tinton Falls, N.J. Pansophic will acquire AVL's Starburst+, an IBM Personal Computer AT-based system that creates color slides integrating text, images and graphics. AVL is an authorized IBM value-added dealer.

PCR and the AVL division mark Pansophic's third and fourth acquisitions in recent weeks. Pansophic has also purchased SPSS, Inc., a Chicago-based developer of statistical software applications, and Fusion Products International, Inc. of San Rafael, Calif.

Fusion Products markets System/36 and 38 utilities similar to Pansophic's mainframe offerings, including retrieval, report writing, data dictionary, query and a microcomputer link.

IBM opens chip plant in France

CORBEIL-ESSONNES, France — IBM France recently inaugurated a 45,000-square-meter chip manufacturing facility here.

However, IBM officials privately expressed their disappointment that the French government did not use the occasion of the opening to give its go-ahead to the computer giant's plans to offer a value-added telecommunications service.

The network project is being conducted in conjunction with software and services group Sema-Matra and investment bank Paribas.

Competition

The project faces competition from a rival venture led by Ing. C. Olivetti & Co., the Italian office equipment giant.

The $375 million Corbeil-Essonnes plant will produce bipolar semiconductors for use in IBM's 3090 mainframe series.

IBM Chairman John Akers billed the plant as "the factory of the future."

Akers added that the investment would last 30 years and reported that start-up is planned for the first quarter of 1987.

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The AT&T Model 4112 does everything the 4000 does.

The AT&T Model 4000

The AT&T Model 4024

COMPUTER INDUSTRY

EXECUTIVE CORNER

Alvar Green has been elected president and chief executive officer of Autodesk, Inc. He joined Autodesk in 1984 as chief financial officer. Green succeeds **John Walker**, who will remain chairman of the board and continue as a full-time employee engaged in product design development and planning. **Daniel Drake**, co-founder, vice-president and director of the company, will assist Green in the administration of the company.

■

John Donnelly has been appointed president and chief executive officer of Concord Data Systems, Inc. in Marlboro, Mass. Donnelly succeeds C. Kenneth Miller, the company's chairman and chief technical advisor as well as chairman of Concord Communications, a sister company of Concord Data Systems.

■

Mohawk Data Sciences Corp. has named **Karl H. Niemuller** president and chief operating officer of the company's MDS Qantel subsidiary. Niemuller has served as chief operating officer of Qantel since July 1986. Prior to that, he served as vice-president of Mohawk Data Sciences Corp.

■

Gould, Inc. has elected President and Chief Executuve Officer **James F. McDonald** to the additional position of chairman and elected **William F. Glavin**, vice-president of Xerox Corp., to the company's board.

■

Julius M. Dziak has been promoted to president and chief operating officer of Endata, Inc., based in Nashville. Dziak joined Endata in 1979 when his firm, Alpha Data Sciences, Inc. was acquired by Endata. He served as executive vice-president of the corporation and chief operating officer of the Data Imaging Division.

■

Jacob S. Vigil has joined MIPS Computer Systems in Sunnyvale, Calif., as senior vice-president of engineering and manufacturing. Vigil came to MIPS from Hewlett-Packard Co., where he was the manager of systems management operation in the information technology group.

■

Nastec Corp. in Southfield, Mich., announced the appointment of **Martin Sprinzen** as president and CEO of the company. Sprinzen previously served as vice-president of engineering at Relational Technology, Inc.

■

Edward L. Marinaro has been promoted to chief executive officer of Western Digital Corp. in Irvine, Calif. As CEO, he will be responsible for Western Digital's manufacturing, engineering and marketing functions. Prior to his promotion, Marinaro served as executive vice-president of the company.

■

Cullinet Software, Inc. announced the appointment of **Roger A. Dorf** to the position of vice-president of extended support services. Dorf joins Cullinet from ROLM Corp., where he was vice-president of operations.

■

David M. Weishaar has been appointed executive vice-president and chief operating officer of Sequoia Systems, Inc., in Marlboro, Mass. Weishaar was vice-president of manufacturing at the company.

■

Perfect Data Corp. in Chatsworth, Calif., announced the appointment of **Lee R. Mannheimer** as president and chief executive officer of the company. Mannheimer came to Perfect Data from Vivitar Computer Products, where he served as vice-president and general manager.

■

Howard Haythornthwaite has been named senior vice-president of Cullinet Software, Inc.'s Asia/Pacific Operations in Singapore. Previously, he served as vice-president of international manufacturing operations at Data General Corp. in Hong Kong.

■

Apple Computer, Inc. announced the promotion of **Lawrence G. Tesler** to the newly created position of vice-president of advanced technology. His responsibilities will include investigating technologies and standards that will be of value to Apple in future product development.

■

Aryeh Finegold has been appointed president and chief executive officer of Hunter & Ready, Inc. in Palo Alto, Calif. Finegold was former president and CEO of Daisy Systems Corp. in Mountain View, Calif.

Alliant files with SEC for public offering

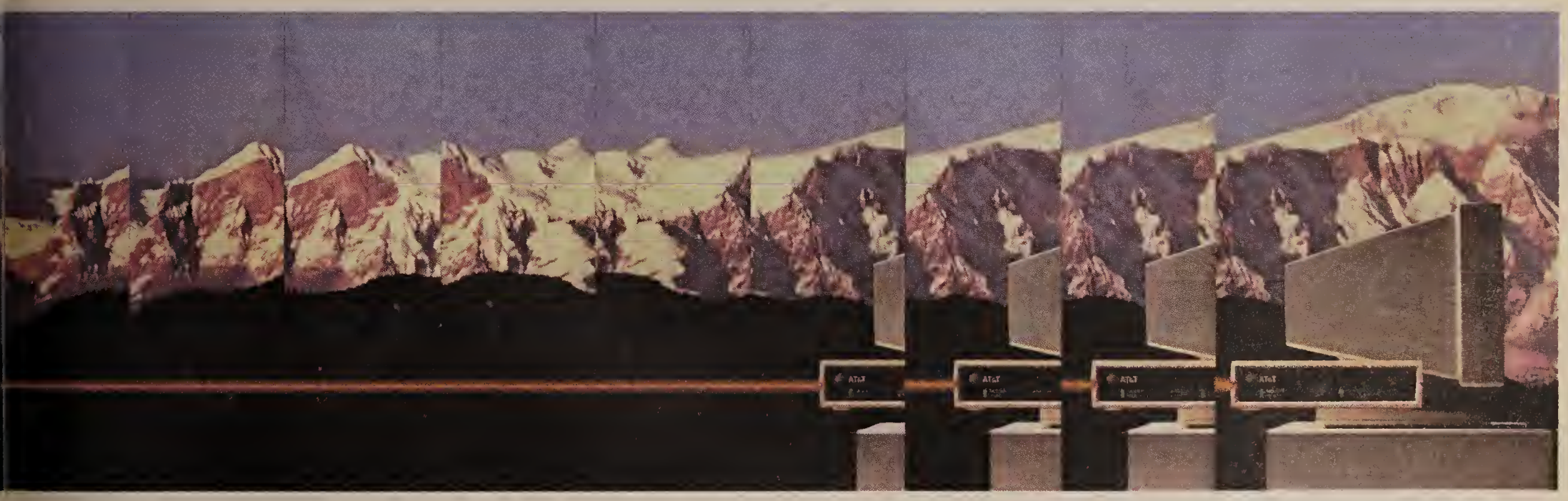
By Stanley Gibson

LITTLETON, Mass. — Alliant Computer Systems Corp. recently announced that it has filed a registration with the Securities and Exchange Commission for an initial public offering of 1.5 million shares of its common stock.

A U.S. offering of 1.2 million shares will be underwritten by a syndicate headed by Morgan Stanley & Co., Inc. and Hambrecht & Quist. The remaining 300,000 shares will be sold internationally by the same corporations. The initial offering price is estimated to be between $13.50 and $15.50 per share.

Alliant manufactures the FX series of parallel processing minisupercomputers used for engineering and scientific applications. Alliant sells its computers both directly and through a joint marketing agreement with Apollo Computer, Inc. To date, Alliant has sold a total of 54 units.

Alliant first attained a profit in the fourth quarter of 1985 and, through the third quarter of fiscal year 1986, has earned $2.4 million in profits, including an extraordinary tax credit of $600,000 on sales of $18.5 million.



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AT&T
The right choice.

Software prices rising up curve

From page 102

press [CW, Oct. 20]. The just-announced DOS-to-MVS/XA migration aids will also help.

When the XA Express train stops, however, some 4381 users may discover they are paying an order of magnitude more for their software than did the top-of-the-line mid-size users six years ago. During a three-year period, the 4381 users will have spent more than one-third — 37% — of their total operating costs on systems software. Measured by the 4381 yardsticks, the 370% increase in systems software costs during the same period for the largest IBM users pales by comparison.

The above intermediate systems example, however, gives the 3090-class users a glimpse of what may await them in the future as IBM expands its new graduated software pricing scheme beyond the intermediate systems market. Two years ago, it was apparent that IBM may have to engage in some creative pricing for its software to realize its business objectives.

> ***"The number of large systems will stay virtually flat — even go down slightly from current levels."***

The reasoning at that time was based on a fundamental change taking place in the way the large systems were being built.

The IBM 3080s and MVS/XA marked the beginning of a new era in the industry; the era of "multi-engines." When IBM started shipping the 3084-Qs and MVS/XA in 1983, this "quad" system marked the first time that the multiprocessor concept was being stretched beyond just the two CPUs working together.

What are the consequences of such a trend? As a result of the new multiengine environment, the number of large systems will stay virtually flat, and even go down slightly from current levels, although the installed million-instructions-per-second capacity will show a healthy growth through 1991. Therefore, as long as the software charges are tied to CPUs, IBM's software revenue can only grow through straight price increases. And that by itself is simply not enough to meet IBM's business objectives.

Considering that the systems software represents only about 9% of an IBM 3090 customer's three-year operating costs, as opposed to 37% for the 4381s, one can see that the large users' spending is now at about the point of IBM's top intermediate customers' spending in 1980.

IBM's software price hikes for large systems still have a long way to go. And that means that large IBM users "ain't seen nothing yet" — to borrow an expression straight from the bullpen. They had better gear up for a long, steep climb up the IBM software pricing curve.

"One phone call...and I can place my clients' advertising in virtually any computer market in the world."

Ellen Freeman is president of Freeman Associates, a media planning and buying service for high-tech advertisers. With 11 years of agency experience, Ellen is one of a handful of people who understands how to plan media for high-tech companies. She has been involved with international as well as domestic programs, and she has definite opinions about the services of CW Communications.

Ellen explains, *"High-tech companies generally don't have the information they need to evaluate international markets. But CW International Marketing Services makes it easy to explore foreign markets by offering in-depth marketing knowledge and expertise."*

Ellen recognizes the frustration of media buyers when considering foreign media. She says, *"There are so many factors involved — time and language differences, commission structures, exchange rates, taxes, translation, mechanical specs. Billing alone is a nightmare."* She adds, *"But CW offers the single-vendor solution. One phone call to a local rep, and I can can place my clients' advertising in virtually any computer market in the world."*

She continues, *"There is a definite lack of research available on foreign publications in comparison to the volume of circulation and readership information provided by U.S publications."* However, Ellen trusts CW International Marketing Services to help her make media choices. She explains, *"CW brings more information to the table than any company I've dealt with. No one else makes international buying as easy."*

Ellen sums it up, *"There are too many things U.S. media buyers take for granted. Buyers generally don't even know the right questions to ask when dealing abroad. CW helps us plan and buy media in multiple countries — all in one 'American' package, eliminating costly errors."*

To find out how CW International Marketing Services can help you, call Frank Cutitta, Managing Director, toll-free at 800-343-6474 (in MA, 617-879-0700).

Ellen Freeman
President
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Wellesley, MA

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Japan directs vendors to honor U.S. trade pact

By Clinton Wilder

Amid widespread charges of continued dumping by Japanese semiconductor vendors, Japan's Ministry of International Trade and Industry (MITI) agreed last week to demand that Japan's 10 largest chip makers stop the practice.

U.S. trade officials had warned recently that they would reimpose duties and fines against the Japanese firms if they continued to sell chips below cost in markets other than the U.S. and Japan. The so-called third-country dumping violates last summer's U.S.-Japan semiconductor trade agreement, which U.S. officials threatened to cancel if the dumping does not end by early December.

MITI has no formal control to regulate prices charged by Japanese vendors but is considered a powerful voice in Japanese trade practices. U.S. and Japanese officials said they may be able to determine the vendors' compliance with the MITI request as early as this week.

Before the MITI announcement, the U.S. Semiconductor Industry Association formally urged the U.S. government to immediately impose unspecified sanctions against Japanese firms violating the agreement by dumping.

Toshiba, Motorola to offer superchips

From page 102

nounced plans last week to enter full-scale production of application-specific integrated circuits in Durham, N.C., some time in 1987. Mitsubishi is said to have earmarked an estimated $12.4 million for the Durham facility.

According to Mitsubishi, the firm chose the U.S. production site to stem growing export profitability incurred by the strong Japanese yen in value against the U.S. dollar.

Kondoh is Asian bureau chief for the CW Communications International News Service.

"When it comes to reaching data communications professionals, Computerworld leads the way."

Edward P. DiMingo
Director Corporate
Communications
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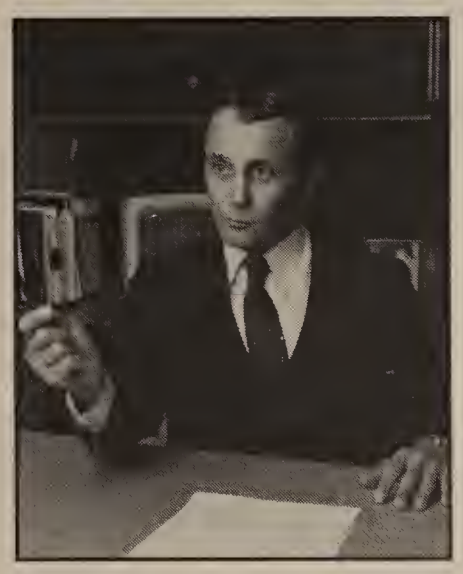
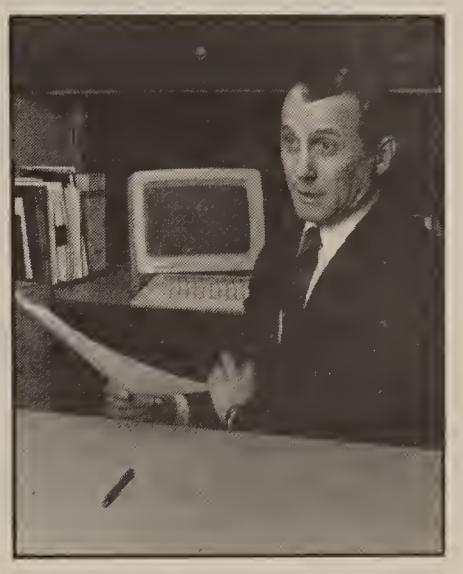
Cherry Hill, NJ





Infotron Systems is a manufacturer of statistical and time-division multiplexers, network concentrators, intelligent switching systems, and network management systems. To Ed DiMingo, Director of Corporate Communications, it's important for Infotron to have high visibility among data communications professionals. So when Infotron introduced its newest product, the InfoStream™ 1500 T1 voice and data multiplexer, he chose Computerworld as the major vehicle for getting the message to the right people — network managers, voice and data managers, and MIS/DP directors.

Ed explains just how he knows their message is being read. *"I put together a list of data communications buyers and influencers. And for the past two years, I've polled these people to find out what they read most. Computerworld always leads the way. In fact, in the most recent study, Computerworld came in way above the others at 68%, with Datamation at 51% and Data Communications at 23%."*

In fact, Ed's own readership studies were reinforced by results of a recent Starch study. *"Our InfoStream ad ranked in the top 10 percentile for 'read most' among all advertisements studied in the issue. There's a real need for T1 information in the communications field among Computerworld's readers, and our message got to these people."*

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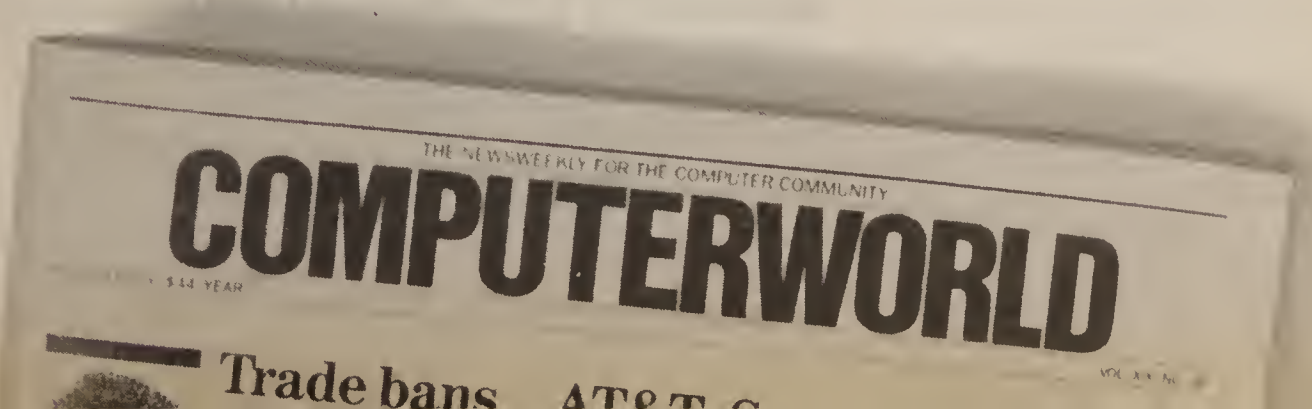

COMPUTER INDUSTRY

5¢ 10¢ NICKELS AND DIMES

Boole and Babbage, Inc. announced revenue for the year ended Sept. 30 of $9.4 million, compared with $7.9 million a year ago. Net income was $1.3 million, or 40 cents per share, compared with a loss of $6 million, or $1.99 per share, in the previous year. For the fourth quarter, revenue was $9.4 million, compared with $7.9 million one year ago.

■

VM Software, Inc. reported revenue for the third quarter ended Sept. 30 of $6 million, compared with $4.3 million in the previous year. Profits were $844,721, or 20 cents per share, compared with $668,988, or 16 cents per share, in the like period a year ago.

■

Autodesk, Inc. announced preliminary results for its third quarter ended Oct. 31 of revenue of $13.6 million and net income of $3 million, or 43 cents per share. In the like quarter a year ago, Autodesk earned $1.8 million, or 26 cents per share, on revenue of $7.7 million.

■

Commodore International Ltd. announced revenue for the first quarter ended Sept. 30 of $176 million, compared with $159.2 million a year ago. Net income was $3.7 million, or 12 cents per share, compared with a loss of $39.2 million a year ago.

■

Paradyne Corp. showed no signs of emerging from its prolonged slump, reporting a net loss for the third quarter of $13.6 million, compared with a net loss a year earlier of $6.3 million. Revenues were $64.2 million, up slightly from $57.8 million in the third quarter of 1985.

■

Centronics Data Computer Corp. announced revenue for the third quarter ended Sept. 28 of $38 million, compared with $50.2 million a year ago. Profits were $206,000, or 1 cent per share, compared with $632,000, or 5 cents per share, in the like quarter a year ago.

■

Telerate, Inc. announced revenue for the fourth quarter ended Sept. 30 of $61 million, compared with $41.8 milion last year. Profits were $11.1 million, or 25 cents per share, compared with $8.3 million, or 19 cents per share, in the like quarter last year.

For the year, revenue was $210.4 million, a 42% increase over the $148.5 million reported in the prior year. Net income for the year rose 16% to $38.8 million, or 87 cents per share, from $33.4 million, or 76 cents per share, in the previous year.

■

The Ultimate Corp. reported revenue for the second quarter ended October 31 of $42.9 million, compared with $34.2 million last year. Profits were $3 million, or 31 cents per share, compared with $3.3 million, or 40 cents per share, in the comparable period a year ago.

■

Emulex Corp. said increased demand and margins for new storage controllers contributed to a 9% increase in first-fiscal-quarter earnings to $1.5 million, or 12 cents a share. Revenue showed a marginal increase to $25 million, the Costa Mesa, Calif.-based firm reported.

■

Wicat Systems, Inc. reported revenue for its second quarter ended Sept. 28 of $8.3 million, down 26% from the $11.2 million reported for the like period one year ago. Net loss for the quarter was $1.6 million, or 7.6 cents per share, compared with the second-quarter net income oneyear ago of $213,000, or 1 cent per share.

Ashton-Tate profits rise

From page 103

Third-quarter earnings per share were 65 cents, compared with 49 cents in the third quarter of 1985. Revenue was $57.7 million, a 102% increase over the previous year's $28.6 million. Nine-month earnings were $147.9 million, compared with $80 million.

During the third quarter, Ashton-Tate completed its acquisition of Decision Resources, a business graphics software developer, and announced Dbase Mac, a relational data base management system for the Apple Computer, Inc. Macintosh.

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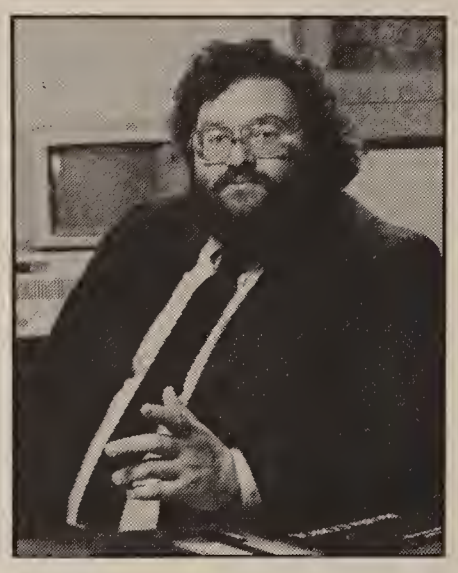
Marc Sokol
Vice President
REALIA, Inc.
Chicago, IL



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- Outlook of discrete market segments: who's going to be up — and who's going to be down?
- Communication networks management: how do they hope to solve their most pressing problems?
- Increased automation of the applications development process: can AI help?

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COMPUTERWORLD's paid circulation climbed to over 129,522 this fall. Folio 400 (Folio Magazine's study of trade publication performance) placed us first in total revenue. As the industry grows, so will **COMPUTERWORLD.** It will continue to offer the high quality news coverage and editorial content that has attracted its readers. What does that mean to you, our advertisers? Good news...in the form of wide exposure.

The Classified section of the newspaper is laid out in an attractive format and is easy to read. It offers classifications to solve a variety of problems:

Position Announcements, Buy • Sell • Swap, Software For Sale, Software Wanted, Time & Services, Bids & Proposals, Business Opportunities, Real Estate, Auctions, Positions Wanted, Seminars & Conferences, Publications and **The Bulletin Board**

So, as a nationwide publication, we give you the exposure you want. As a weekly publication, we give you the immediacy your advertisements need.

A number of Executive Reports and Product Spotlights are scheduled to run in **COMPUTERWORLD** during the first quarter of 1987. Each of these features will focus on one aspect of the computer industry and give our advertisers a chance to reach a more select audience. These are some of the topics the features will cover:

Executive Reports

- Jan 12 - **Capacity Planning**
- Feb 9 - **State-of-the-art data centers**
- Mar 9 - **Vertical Markets: Banking**

Product Spotlights

- Jan 19 - **Terminals**
- Feb 2 - **Networks**
- Feb 16 - **Micro/mainframe links**
- Mar 2 - **PC storage devices**
- Mar 16 - **Graphics**
- Mar 30 - **Modems**

COMPUTERWORLD publishes every Monday with an ad deadline of 10 days prior to each issue date. You may send in copy to be pubset or camera-ready material (velox or negative) via the mail. We provide telecopier service and will also take ads over the phone.

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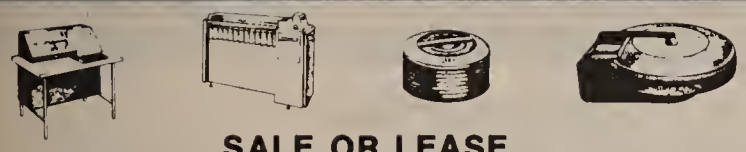

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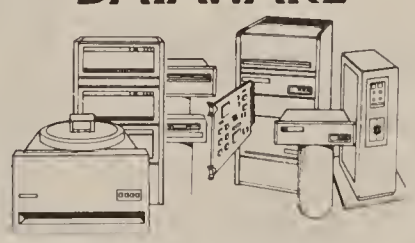

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Rates: Open rate is $176.40 per column inch. Columns are 1 13/16" wide. Minimum ad size is 2 column inches (1 column wide by 2 inches deep), and costs $352.80 per insertion. Additional space is available in half inch increments. Some sample sizes and costs are shown.

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Copy: Copy sent in via the mail or telecopier (telecopier extensions are 410 and 451) should be cleanly typewritten. Ads must be given over the phone to our team of ad takers, or sent in writing, no camera ready material will be accepted. The standard size is 1 column by 1 inch deep. These units may be combined to form larger size ads. Describe the equipment very briefly, give the price and the name of the person to contact. All ads will be set up using a standard format. No borders or logos are allowed.

Cost: The price for each standard unit is $160.00 (One unit minimum and no fractional units allowed.) There are no agency commissions or quantity discounts.

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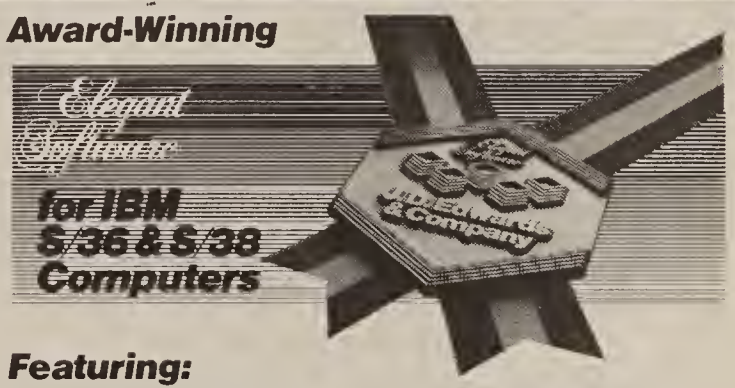

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  - VAX/VMS, DOS/VSE, VM, MVS
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Robert D. Williams
Manager of Corporate Recruiting
Advanced Programming Resolutions, Inc.
2715 Tuller Parkway Drive
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Qualified candidates must have 2-5 years of experience in one or more of the preceding areas and a master's degree or equivalent in computer science.

We offer competitive salaries and a comprehensive benefit package. Send resume to:

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Qualified candidates must have at least two years experience in system software development, design and implementation.

Starting in January 1987, successful candidates will participate in a comprehensive training program for up to six months in West Germany at one of DANET's offices in Munich, Stuttgart or Darmstadt.

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Interviews will be held in the US during November and December. Please send resumes, salary requirements and references to our North American representatives: **Telematics International, 505 Hamilton Avenue, Suite 200, Palo Alto, CA 94301, Attn.: International Project Coordinator**

IMMEDIATE OPPORTUNITIES

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UNIX/C - Software engineers and systems programmers. Salaries $27-49K.

IBM PROGRAMMER ANALYSTS - COBOL and/or ALC opportunities for programmers and project leaders. Salaries $22-37K.

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For more information call Tom collect at **(301) 840-0460** or send resume to

J. Randall Associates
P.O. Box 1521
Rockville, MD 20850
Attn: Tom Arnold

Mississippi State University invites applications for anticipated employment opportunities for the following positions within Administrative Data Processing prior to June 30, 1987. These positions will be filled after December 17, 1986 as positions become available.

- Systems Analysts
- Senior Programmer Analysts
- Programmer Analysts
- Computer Programmers

Responsibilities include the development, implementation and maintenance of application software in the areas of financial accounting, payroll/personnel and student information systems.

All positions require a B.S. degree in Computer Science or related discipline. Experience with DMS 1100, TIP and DPS on Sperry 1100 mainframes is highly desirable. Experience in a University environment and knowledge of microcomputer applications are definite pluses. Cobol programming experience is required.

To be considered for any of these positions, submit resume to:

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Manager of Administrative Services
Computing Center and Services
P.O. Drawer CC
Mississippi State, MS 39762

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Hartford, CT 06106
(203) 278-7700

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Embry-Riddle Aeronautical University invites applications for the following positions located in Daytona Beach, FL. The University offers aviation oriented degree programs at the Bachelor's and Master's level at two resident campuses located in Daytona Beach, FL and Prescott, AZ and a network of resident centers located around the world.

SYSTEMS ANALYST

Provides systems analysis and design for University automation requirements. A minimum of 2 years experience as a systems analyst and knowledge of COBOL required.

PROGRAMMER/ANALYST

Provides computer programs, systems evaluation, documentation and implementation. A minimum of two years experience in programming and analyst responsibilities and knowledge of COBOL required.

A computer related degree, HP3000 experience and knowledge of QUIZ and QUICK preferred for both positions. Competitive salary and benefits package offered. Please send resume and salary requirements in confidence to: Embry-Riddle Aeronautical University, UA Personnel Office, Star Route Box 540, Bunnell, FL 32010. EOE

SYSTEMS PROGRAMMER I

Position with the City of Colorado Springs, reviews operating systems and other computer error runs to debug software programs. Interprets machine stops or other inoperable situations and corrects error conditions. Provides technical assistance in the use and troubleshooting of the computer operating systems. MUST HAVE: Bachelor's degree, preferably in Computer Science, Management Information Systems, or a technical field involving computer science coursework; 1 year of journeyman-level applications programming experience involving the use of Assembler or high-level languages; or an equivalent combination of education and experience. DESIRABLE: Knowledge of IBM OS/MVS operating systems. SALARY: $2,220-$2,570/month. A City application is required and may be obtained by contacting 303/578-6686. The application must state position title/code and be received by Friday, Dec. 5, 1986, at the City of Colorado Springs, Dept. of Personnel, Attn: Position Number W-2200, P.O. Box 1575, Colorado Springs, CO 80901. Application office hours are 9 a.m. to 5 p.m., Mon., Wed., and Fri. We are an Equal Opportunity/Affirmative Action Employer.

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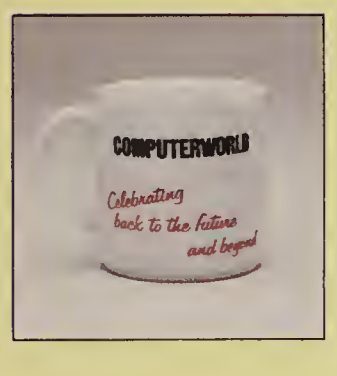

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EXECUTIVE DIRECTOR ALABAMA SUPERCOMPUTER NETWORK AUTHORITY

The Alabama Supercomputer Network Authority, in conjunction with the Department of Finance, is charged with the establishment of a supercomputer center to provide services for the educational, research, and industrial needs of the state. The authority invites nominations and applications for the position of Executive Director. The supercomputer will be physically located in Huntsville, Alabama with statewide access through a high speed telecommunications network with major nodes located throughout the state. The executive director and his or her staff will provide the management and direction of the program and will report directly to the authority.

RESPONSIBILITIES OF THE EXECUTIVE DIRECTOR:

1. To provide leadership and coordination for the facilities vendor.
2. To consult with the community of users and establish procedures necessary for fair and equitable access to the supercomputer.
3. To insure the quality and proficiency of the services provided by the facilities vendor.
4. To provide and execute a marketing plan which insures the best and maximum use of the supercomputer for the development of the State of Alabama.
5. To advise and instruct the facilities vendor regarding acquisition of hardware, software and any general service enhancement.
6. To serve as the primary representative of the authority in liaison with the executive and legislative branches of state government.

QUALIFICATIONS:

1. An earned master's degree, doctorate preferred.
2. A minimum of ten years of progressive experience in the overall management and/or coordination of high level computing services preferably with supercomputer involvement.
3. Substantial experience in a university and/or organized research environment with a high level of computer use.
4. Proven ability to organize and market services to diverse clientele.
5. Demonstrated competence in managing the fiscal affairs of large organizations providing computing services.

Applications or nominations must be received by December 15, 1986.

Salary is competitive and negotiable depending upon experience and qualifications. Applications or nominations and requests for information should be directed to:

V. Gordon Moulton
Vice President
AD 205
UNIVERSITY OF SOUTH ALABAMA
Mobile, Alabama 36688

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Software Engineers

COMPUTERPEOPLE DATA SERVICES is expanding its professional staff in our Columbus, Ohio office. We have several long-term consulting engagements for leading edge companies in central Ohio. We have immediate needs for experienced Mini/Micro Specialists to support client applications in telecommunications technology, telephony and manufacturing.

We require a BS degree in computer science, math or electrical engineering and at least 1 year of professional experience. Some opportunities require an MS degree. Applicable skills include:

- C and UNIX
- Multi-layered protocols (X-25)
- Database systems
- Operating system internals

For consideration please send resume including GPA, visa status and salary requirements to COMPUTERPEOPLE DATA SERVICES, Dept. CU-BL, 50 Northwoods Blvd., Suite B, Worthington, Ohio 43085. An equal opportunity employer.

COMPUTERPEOPLE DATA SERVICES

S/38 TECH SUPPORT

TRAMMELL CROW COMPANY in Dallas seeks a qualified person to provide technical, operational and programming support to the company. The candidate we are seeking will have:

- **Bachelor's degree**
- **2-4 years direct S/38 operational experience**
- **RPG III programming experience**
- **Broad range of diagnostic and problem solving skills**

Extensive user interaction will require a professional manner and excellent communication skills.

Trammell Crow Company offers an excellent salary and benefits program in a dynamic, non-smoking environment. For immediate consideration, please send your resume and salary requirements to: **Staff Recruiter, Trammell Crow Company, 3500 LTV Center, 2001 Ross Ave., Dallas, TX 75201-2997.** *An Equal Opportunity Employer.*

SOFTWARE CAREERS

Middle South Services, Inc., the technical service subsidiary of the Middle South Utility System has excellent career opportunities available for high caliber data processing professionals. Opportunities currently exist in the Technical Support, Application Development, and Data Base Administration areas. Our current technical environment consists of multiple 3090s, 3083 (MVS/XA), 4381 (VM/CMS), PC XT/AT, and Tandem NSII.

TECHNICAL SUPPORT ANALYST

These individuals will interface with other MIS professionals to develop production procedures and standards, production job streams, and other projects related to automated scheduling, disaster recovery, and quality/production reporting. Requirements include thorough knowledge of OS/JCL, TSO, OS/MVS along with familiarity with SAS, EASYTRIEVE, and UCC 7/11.

ANALYST/PROGRAMMER

The position involves working as a team member developing highly complex Data Base oriented business applications. The position requires the ability to take an application completely through the development cycle. Technical expertise should include experience in Cobol, TSO/ISPF, IMS DB/DC, and ADS-II. Exposure to 4th GL is considered a strong plus.

DATA BASE ANALYST

The position involves designing and implementing physical data bases for in-house developed applications as well as implementing and tuning package applications. The position requires a thorough knowledge of IMS concepts with at least 3 years experience performing DBD, PSB, MFS, ACB gens. Knowledge of IMS utilities including reorganizations, recovery, and SMU II is required.

Middle South Services, Inc. offers an exceptional Relocation Package including Relocation Allowance (One Month's Salary) . . . Paid Moving Expenses . . . Paid House Hunting Trip . . . Mortgage Interest Differential plus Interim Living.

For more information on these positions, call our toll free number below, or to apply directly, send your resume to:

Joseph Hotard
MIDDLE SOUTH SERVICES, INC.
P.O. Box 61000, New Orleans, LA 70161
1-800-231-4481
In LA call collect (504) 569-4965

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Qualified individuals are invited to forward a resume in confidence to: **Robert Scott, Corporate Recruitment, Hospital Corporation of America, One Park Plaza, Nashville, TN 37202-0550.** Equal Opportunity Employer. NO AGENCIES PLEASE.

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Dept. of Human Resources
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42nd & Dewey Avenue
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POSITION ANNOUNCEMENTS

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- Responsible for physical data base designs supporting application development projects, production data base performance monitoring, data base tuning and data base environment configuration changes
- BS/BA degree in Computer Science or Math
- 7 years Data Processing experience; 2 years in data base design and support
- Must have VM/CMS experience
- SQL/DS or SQL/DB2 experience a plus

Please forward resume and salary history to: **Confidential Reply Service, Dept. L-66, Thompson Recruitment Advertising, P.O. Box 450447, Atlanta, GA 30345.** All replies will be forwarded to our client unopened. No phone calls please. Our client is an equal opportunity employer.

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Los Angeles, CA 91367
(818) 884-3000

Technical Direction, Inc.
5005 Texas St., Suite 301
San Diego, CA 92108
(619) 297-5611

Computer Resources Group (Agency)
303 Sacramento St.
San Francisco, CA 94111
(415) 398-3535

ARIZONA
Professional Career Consultants
4725 Scottsdale Rd, Suite 209
Scottsdale, AZ 85251
(602) 274-6666

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Write installation procedures and instructions for new MAPPER systems including test development, problem duplication and dump analysis. Provide technical support to foreign customers and on-site support to field personnel and customers.

Requires Bachelor's degree in Computer Science or equivalent combination of education, training, and/or related work and experience established by an independent written evaluation. Requires five years field experience including system and application MAPPER experience, product generation, configuration, testing, and application design problem diagnosis. Requires experience with PRIMUS. Experience must include project control for at least one major project installation, and have taught at a technical level both field support and customer personnel. Experience requirements may be concurrent. Salary $3,333 per month.

Submit resumes to: Mr. R.J. Tibbetts, #6-67, Minnesota Department of Jobs and Training, 690 American Center Building, 150 East Kellogg Boulevard, St. Paul, Minnesota 55101.

POSITION ANNOUNCEMENTS

DATA PROCESSING MANAGER

Diversified health management company has immediate opening for manager with 5+ years of programming/systems experience, knowledge of networking, and 2+ years supervisory experience. Must relate to executive management regarding strategic business direction/hardware and software. Oversee MIS staff functions. Health care or insurance industry background desired. Send resume, including salary requirements, to: Elizabeth Alvarez, California Personnel Planning, 1000 W. 9th Street, Los Angeles, CA 90015.

SR. PROGRAMMER ANALYST – Must know machine code language, computer hardware architecture and software interfaces. Must have experience working independently or with small team in system programming problem solving. Must have 4 years experience in ACP/TPF systems and knowledge of airline data communications facilities. Provides responsive solution to fast online processing demands requiring instantaneous retrieval or modification of information. Analyze, design, code, test and implement both simple programs for small enhancements to system and major rewrites of control program logic for central processing units, direct access storage devices, real-time tape devices or data communications facilities. Salary: $2,931.25 per month; 40 hours per week. One position available in Englewood, CO. Apply by resume to nearest Job Service Center referring to J.O. #CO2734025.

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We offer a complete and competitive benefits package, with salary commensurate with experience and qualifications. If you are looking for a challenging position in a company that recognizes job performance, we have a basis for an interview. Send resume and salary requirements to: United Fire & Casualty Company, Personnel Department, P.O. Box 4909, Cedar Rapids, IO 52407. Telephone in Iowa 800-332-7977, outside Iowa 800-553-7937. Equal Opportunity Employer.

POSITION ANNOUNCEMENTS

Computer Programmer

Program and operate computers. Change and adapt alphabetic or numeric input data from Latin to Farsi to get Farsi print. Four years experience. 40 hours/week. $13.50/hour. Job in LA. Send this ad and your resume to Job # DN-9909, PO Box 9560, Sacramento, California 95823-0560 not later than December 9, 1986.

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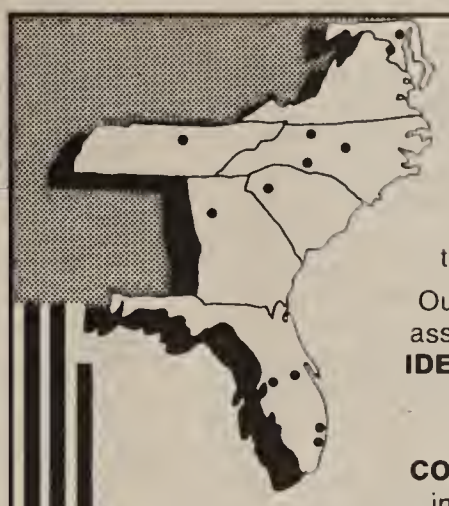

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DB2 answers skeptics, thrives

From page 1

Competitors say accounts of the move to production systems can be greatly exaggerated. Amex Life Assurance, a division of American Express Co., recently chose Supra, a relational DBMS from Cincom Systems, Inc., instead of DB2.

"We've had very good success when the buyer had a chance to evaluate other products," claims Cincom President Dennis Yablonsky.

"IBM has put DB2 in a lot of places where they have IMS installed," says John Cullinane, chairman of Cullinet Software, Inc. That just means IMS sites are experiencing "a tremendous amount of confusion" as they try to deal with both. "DB2 is not a very good engine," Cullinane adds.

Officials at other independent software companies say IBM created nearly irresistable pressures on MIS departments when it offered six months free use of DB2 earlier this year.

In many cases, MIS managers assigned one or two programmers to work with it on an experimental basis. At the end of six months, DB2 did not go into production; it went on the shelf, they claim.

Daniel A. Pasker, a spokesman for the British Columbia Telephone Co. in Vancouver, B.C., which tried DB2 and backed off, says budget constraints, a shortage of technical staff and "the large amount of work needed on our data before we could implement DB2" forced the retreat.

Arthur Andersen's Mullen says DB2 is being bought by some customers "who have been oversold on its simplicity." When they learn otherwise, the customers abandon the effort to develop in-house expertise and stop using it, she says..

Nevertheless, a broad band of independent observers see DB2 moving swiftly into DP operational functions.

Industry analyst Scott M. Smith, vice-president of Donaldson, Lufkin & Jenrette, Inc., a New York brokerage house, acknowledges that "DB2 is not being used to run the Citibank automatic teller machine network," but he says the people who have bought it "are starting to use it in more serious applications."

Paul Hessinger, a frequent lecturer on DB2, says he knows of 55 to 60 large corporations that are using DB2 in production systems. "A good percentage of the current DB2 user base is moving it into production use or is considering doing so," says the vice-president of research at the Computer Task Group, Inc. in Buffalo, N.Y.

Getting figures to back up these impressions is difficult. Surveys on DB2 use frequently precede the second- and third-quarter period for the year that IBM complimentarily offered DB2 for six months. A survey taken at the end of 1985 showed DB2 installed at 450 organizations, but independent observers think the figure has moved far past that point this year. Computer Task Group's Hessinger says IBM's goal is to get 80% of its IMS customers to use DB2 by 1990, narrowing IMS's work load to high-volume tasks.

Many DB2 users say they believe IBM will continue to improve the performance of DB2, and it is this faith that angers IBM's competitors in the DBMS market.

The independents are hurt by IBM's ability to exploit any doubts about their staying power, asserts Martin Goetz, senior vice-president and chief technical officer at Applied Data Research, Inc., marketer of the Datacom/DB DBMS. "Will the company be there to improve the product? Particularly in data base, it's a very tough decision to move away from IBM," he says.

But several spokesmen for the independent companies express doubt that IBM will be able to improve DB2's performance much beyond the February release.

"It's extremely difficult to build performance into a product that doesn't have it to begin with," asserts Stuart Miller, president of Software AG of North America, Inc. in Reston, Va.

Edward Knauer

Miller says he does not doubt IBM will improve performance somewhat, but he "disbelieves the expectations IBM is building up in people's minds."

The Amex Life Assurance division of American Express cites three factors — DB2's lack of a fourth-generation language, data dictionary and referential integrity — in explaining why it chose Cincom's Supra over DB2.

"To build an integrated product line is incredibly difficult to do," says Cullinet's Cullinane, citing the data dictionary and ADS/Online development language that work with its DBMS, IDMS/R.

But the independents themselves are moving quickly to fill much of the void left by IBM by making their established products work with DB2.

In addition, IBM is trying to upgrade its young fourth-generation language, Cross System Product, or CSP. Arther Andersen's Mullen says customers complain about a very long learning curve with CSP, but they were using it after two weeks. "Still, development tools are not IBM's thing. IMS tools never really became wonderful."

Indeed, it is the analogy to IMS that some observers think is misleading the skeptics of DB2. When it first came out, IMS was a rough product, difficult to learn and filled with bugs. DB2 "appears to be an overnight success, but it was very carefully groomed. IBM could have released it much sooner," says Edward Knauer, president of Knauer Consulting in New York, a firm that specializes in DB2 applications.

IBM offered DB2 at a time when the market's appetite for relational qualities was blooming, and it released it in such a fashion that the product was unmistakably distinct from IMS. Initially selling a dual data base strategy, IBM educated its customers on DB2 as a relational product without prompting them to try to move all their IMS applications over to it, says analyst Smith of Donaldson, Lufkin & Jenrette.

Smith says he initially deplored IBM's dual data base strategy, but now he sees it as "extremely smart." Because DB2 was distinquished from IMS, IBM succeeded in launching DB2 as an independent product. "If IBM had named DB2 IMS/R, the new product would have carried the stigma of IMS's many problems," Smith says.

Perhaps even more important, users of DB2, including The Port Authority, are finding unanticipated productivity gains.

"We think we can do applications in less time with DB2," says Arthur Andersen's Mullen. "But we still use the old standards for estimating application development. We are using up all the estimated time on DB2 applications in order to do a better system the first time around.

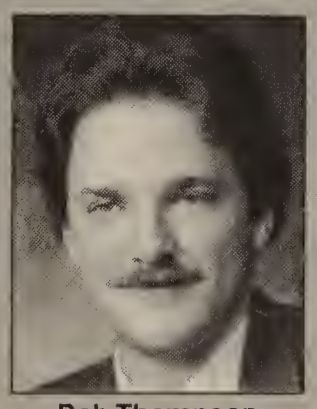
"There's a productivity gain. It just doesn't show up as a smaller amount of time," she says.

Users say DB2 can shoulder IMS chores — and then some

Skeptics may ask how much of IBM's IMS load DB2 will be able to absorb, but the existing production systems indicate that share may be more substantial than anticipated. In addition, the users say the trade-off is not one for one; new DB2 applications not only pick up IMS functions but add relational capabilities as well. They also yield productivity gains on the development side, the users say.

For example, The Port Authority of New York and New Jersey put its payroll, personnel and benefit applications under DB2 Version 1.0 and will soon implement Version 2.0. According to Robert Hurley, senior systems designer, response times were horrendous on the agency's IBM 3081 mainframe but improved to acceptable levels on a 3084, which also runs the agency's TSO teleprocessing monitor and major accounting applications.

The agency "had an appetite for a relational type data base," particularly for its personnel application, Hurley says. The agency keeps records on 13,000 employees, with 2,000 fields per record. Personnel managers frequently requested ad hoc queries against this data base, and those queries represented about one-eighth of the applications work load. Now with DB2 and IBM's Query Management Facility, the personnel department is able to execute half the queries on its own, Hurley says.



Bob Thompson

Campbell Soup Co. in Camden, N.J., uses DB2 for a menu-driven decision-support system for retrieving sales information on its 13 business units. The system incorporates sales data for the previous two years and can indicate how products or groups of products are doing compared with an earlier period. It makes possible "the retrieval of information that was very hard to get at before," says Robert Thompson, data base administrator.

Campbell Soup is now working on a DB2 application that will allow sales representatives to call in information from hand-held computers on how products are advertised, displayed and promoted by individual stores. The information will go into a massive data base with 40 million rows, and IBM has been closely involved in the design phase to try to make certain it performs as expected, Thompson said. "The implications are incredible. It will help the whole sales force. If we see we aren't getting enough resources in a particular store, we can aim resources at it," he says.

The system, to be phased in starting in February, will replace a procedure that had sales reps mailing in paper forms once a week to their headquarters.

Depository Trust Co. in New York serves as the clearinghouse for stock market transactions executed by brokerage houses and banks. As it logs each transaction — which may represent the trade of a 100-share block of stock or blocks of thousands of shares — the log is translated into a DB2 table with 20 columns and 600,000 rows. The transfer takes place once a minute, and DB2 "keeps up with the actual writing of the log," says Nicholas J. Arrigan, vice-president of systems and computing. The data base serves as a recovery vehicle if Depository Trust's system fails, he adds.

Depository Trust tested DB2's performance to make certain it could keep up with the log writing process. It found it capable of processing 48 transactions a second, with each transaction handling 14 to 17 SQL statements. The test was run on an unencumbered 3090-200, and the results match IBM's performance claims for Version 2.

Although Arrigan says his firm relies on Software AG of North America, Inc.'s Adabas for regular transaction processing, he says DB2 will assume more of the traditional data base management system load.

Many of these production uses of DB2 remain in the light transaction volume range, these users admit. Although the number of trades represented in the Depository Trust log is large, the application handles a relatively low transaction volume, Arrigan concedes.

— Charles Babcock

Cullinet posts quarterly loss

By Clinton Wilder

WESTWOOD, Mass. — Formerly the financial star of the mainframe software industry, Cullinet Software, Inc. last week reported its second straight quarterly loss on sales that dropped 21% from year-earlier levels.

Citing an unexpected slowdown in European sales, Cullinet reported a loss of $5.9 million, or 19 cents per share, on revenue of $34.2 million for its second quarter, which ended Oct. 31.

In the year-earlier period, the firm earned $3.6 million, or 12 cents per share, on $43.2 million in sales.

Brian Mutert, an analyst with San Francisco-based Robertson, Colman and Stephens, said the mainframe data base management market continues to be soft, especially outside the U.S.

"The sales of Applied Data Research, Inc. continue to disappoint Ameritech corporate management, and Software AG of North America results are still softer than expected for mainframe systems," Mutert noted.

Cullinet President and Chief Executive Officer David Chapman said the firm has substantially completed its sales and support staff hiring in the U.S. but continues to hire in those areas overseas.

Software Research future uncertain; investors may sell firm, source code

By Stanley Gibson

NATICK, Mass. — Uncertainty about the future of Software Research Corp. (SRC), a company specializing in networking software, is leaving some of the company's customers in doubt about their investments.

Former SRC employees said the company's venture capital investors may be preparing to sell the company or at least the source code for SRC's software. They said they anticipate a resolution of SRC's situation this week.

"Last week our technical rep called to say he had been laid off. We are totally taken aback," said an MIS executive at a major insurance company being used as a beta-test site for SRC's Electronic Office Interchange (EOI) software.

"It seems a little strange," the user continued. "We were about to begin a beta test with EOI next week."

The user said their account representative told them that SRC's venture capitalists are concerned about the company and that SRC may not support EOI.

"Luckily, we are not terribly dependent on it," the user said.

Calls to SRC were referred to the company's president, Martin Waters, who could not be reached for comment.

EOI is the electronic mail component of the company's main product, Strategic Network Environment, which is software that allows Digital Equipment Corp., Wang Laboratories, Inc. and IBM computers to communicate with one another. EOI is said to connect DEC's All-In-1, Wang Office and IBM's Professional Office System.

According to several former employees, SRC laid off some 20 workers on Nov. 14. The company had two earlier rounds of layoffs this year [CW, July 14]. Together, the layoffs have reduced the firm's work force by more than half the original total of 125.

Founded in 1978, SRC has received $11 million in venture capital since 1984. Its principal investors are Eastech Management Co. of Boston and New York-based Welsh, Carson, Anderson & Stowe.

Fred Wang succeeds father

From page 102

for gaps in its product line and weak field support. "I will be addressing the general perception issues that lag the reality," he said. "I want to make sure that our strategy is understood."

All signs have pointed to Wang as the heir apparent to his father since the 1985 resignation of former President John Cunningham, who took over the helm of Computer Consoles, Inc. Between Cunningham's departure and Fred Wang's promotion, An Wang returned to a much more active role in running the company.

An Wang, 66, retains the titles of chairman and chief executive officer and has no plans to retire, a company statement said. He will oversee Fred Wang and other members of the corporate staff, while Fred Wang will take over most of the customer visiting done by his father in the past year.

"Dr. Wang can now step back up to his pedestal, which I think is positive," said George Colony, president of Cambridge, Mass., research firm Forrester Research, Inc. "To have Fred in charge of operations now is a step forward."

However, Colony voiced a concern about Fred Wang repeated by many observers and Wang insiders [CW, Sept. 8] — the company's ability to recruit top management talent with its strong orientation around the Wang family.

Other observers agree with Fred Wang that the company's biggest problem is market perception.

"They are still seeking credibility in a marketplace that is very different from the one in which they were successful," said Amy Wohl, president of Wohl Associates in Bala-Cynwyd, Pa. "More and more of the office-systems buying decisions are being made by DP managers who don't have that much familiarity with Wang."

Timeplex offers investors reason to give thanks

ACTIVE ISSUES
Kathy Porteus

During the upcoming holiday, investors in Timeplex, Inc. (TIX — 20½) will have reason to give thanks.

In the last eight weeks, the price of Timeplex shares has surged more than 30%. Analysts believe several recent developments affecting the data communications supplier should sustain its stock's strong move.

Timeplex's key product area is its Link family of T1 network resource managers that operate mainly over T1 transmission facilities. T1 lines are terrestrial digital circuit lines that transmit at a rate of 1.54M bit/sec. According to Alexa McCloughan, analyst with Goldman, Sachs & Co., "Timeplex dominates the market for T1 multiplexing equipment, which, with annual shipment growth exceeding 30%, is one of the fastest growing segments in the data communications industry."

At a Nov. 10 meeting for securities analysts, Timeplex discussed several developments that analysts say further strengthen the company's position.

First, AT&T reduced its tariff on T1 transmission lines for distances exceeding 1,000 miles by 40%, a move likely to stimulate demand for T1 equipment. Second, Timeplex disclosed that it raised prices by 14% in early September on all T1 multiplexer products sold domestically. Despite the price hike, orders in September and October were reportedly above expectations.

Greg Francfort, securities analyst with First Boston Corp., says Timeplex recognizes the possibility that current strong orders may be borrowing from business in the second half of its fiscal year, ending June 30, 1987. "As a precaution, the company is trying to control expenses now," he observes.

The company's stock repurchase plan is also an important factor. Since July, Timeplex has bought back roughly 5% of its outstanding shares and can repurchase up to 500,000 additional shares before July 1987. Analysts consider such a buy-back program significant because it offsets the dilution in per-share earnings that would result from exercising stock options or converting the company's bond issue into common stock.

"These new variables have certainly warranted Timeplex's stock move," says Jon Gruber, senior partner with Montgomery Securities. Gruber, who has recommended purchase of Timeplex since it traded at 15, says he expects further boosts in the stock price when the company reports strong December quarter results and begins its delivery of its new Link/2 resource manager, which is currently under beta test.

Analysts estimate Timeplex will earn between $1.30 and $1.40 per share in fiscal 1987, compared with $1.09 per share in 1986. Thomas Linkas of Goldman, Sachs says, "Timeplex should deliver sequentially higher sales and earnings over the balance of fiscal 1987, given the impressive new product flow and the company's momentum in T1 wide-area networking."

"Despite Timeplex's impressive recent stock performance, the stock is still undervalued," Francfort of First Boston says. According to Francfort, investors are concerned that the market for T1 equipment will not grow as fast as projected, and Timeplex's share will suffer as competition intensifies.

"I'm optimistic about the market since it has protected leading T1 suppliers from generally soft industry conditions," Francfort says. "Also, with a large installed base to generate recurring revenue and a strong service organization in place, Timeplex has advantages over many competitors of being a much larger and more stable company."

Porteus is president of Strand Research Associates, a Centerville, Mass.-based company that provides customized research services for financial and high-tech firms.

Paradyne cutbacks trim 280 jobs

By James A. Martin

LARGO, Fla. — Paradyne Corp., in an effort to cut costs and operating losses, said last week it was laying off 280 employees at its headquarters here.

The troubled data communications vendor said reducing its work force by 8% will help cut 1987 spending by about $9 million. Paradyne recently announced a third-quarter net loss of $13.6 million, compared with a loss of $6.3 million during the same quarter last year.

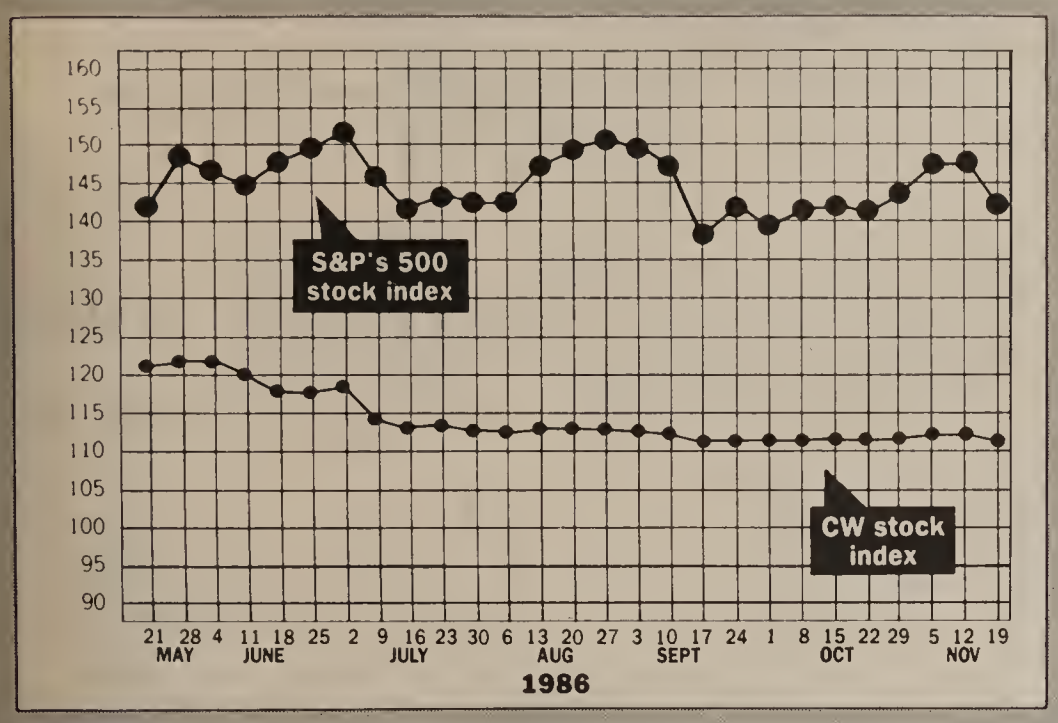
"This is what the textile industry calls 'cutting the cloth to fit the pattern,' " said Irwin Silverberg, an analyst with Silberberg Rosenthal in New York. "They should have made these cuts a long time ago, but I guess they were hoping for an upturn, and they're now having to adjust their expense level so they can make a profit with the current level of revenues."

Paradyne has faced a number of obstacles in the past year, including a federal grand jury indictment accusing the company of fraud, a U.S. Customs Service investigation into the company's export practices and the closing of a Puerto Rico plant that employed 165 workers.

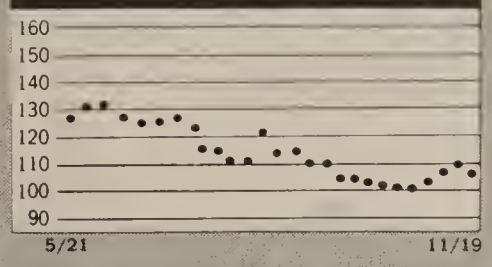
Legal expenses related to the fraud case totaled $837,000 during the third quarter ended Oct. 31.

COMPUTER INDUSTRY

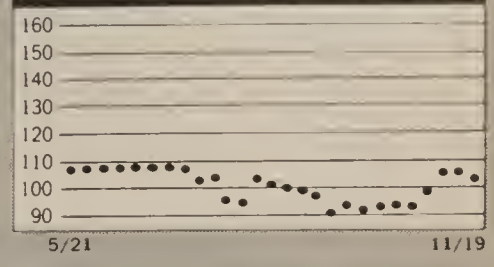
Computerworld stock trading index



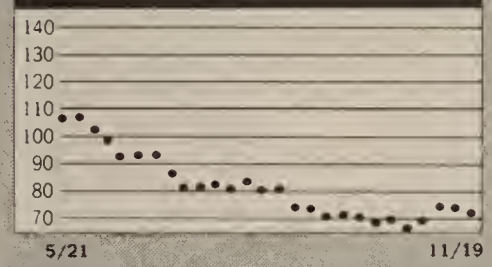
Computer systems



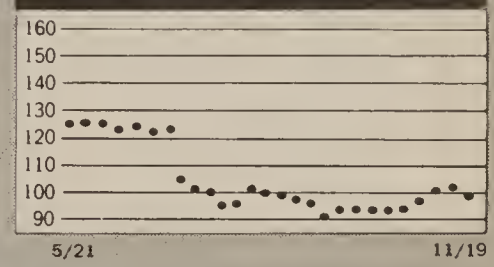
Software and DP services



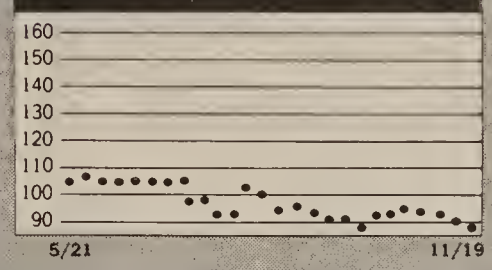
Semiconductors



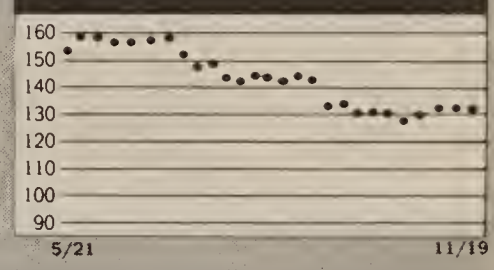
Peripherals and subsystems



Leasing companies



Supplies and accessories



All indexes reflect a historical base of 100 on Dec. 31, 1984, and trace stock market performance in relation to that base. The CW stock index represents the unweighted average performance of the six categories of computer industry stocks.

	11/12/86	11/19/86
Computer systems	110.6	**107.1**
Software and DP services	107.5	**103.4**
Peripherals and subsystems	103.2	**99.6**
Supplies and accessories	134.9	**131.4**
Semiconductors	74.9	**71.3**
Leasing companies	92.4	**89.3**
CW stock index	112.2	**111.5**
Standard and Poor's 500 stock index	147.5	**142.1**

Computerworld stock trading index

CLOSING PRICES WEDNESDAY, NOVEMBER 19, 1986

EXCH		52-WEEK RANGE (1)		CLOSE NOV 19 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	COMPUTER SYSTEMS					
O	ALPHA MICROSYSTEMS	8	4	4.75	-0.1	-2.6
O	ALTOS COMPUTER SYS	19	10	10.13	-0.3	-2.4
A	AMOAHL CORP	23	11	20.75	-0.9	-4.0
O	APOLLO COMPUTER INC	18	9	11.88	-1.0	-7.8
O	APPLE COMPUTER INC	39	19	35.00	-1.6	-4.4
N	AT&T	26	21	25.50	-0.1	-0.5
O	C P T CORP	7	3	3.25	-0.1	-1.9
N	COMPAQ COMPUTER CORP	18	11	16.50	+0.1	+0.8
A	COMPUTER CONSOLES INC	12	6	8.75	-0.8	-7.9
O	CONCURRENT COMP CORP	25	1	15.50	-0.3	-1.6
N	CONTROL DATA CORP	29	18	25.38	-0.3	-1.0
O	CONVERGENT TECH	14	4	6.00	-0.4	-5.9
N	CRAY RESH INC	100	57	71.25	-3.5	-4.7
O	DAISY SYS CORP	32	8	8.88	-0.4	-4.1
N	DATA GEN CORP	50	25	31.00	-1.5	-4.6
N	OATAPOINT CORP	9	5	7.75	-0.5	-6.1
N	DIGITAL EQUIP CORP	105	58	98.50	-3.5	-3.4
N	FLOATING POINT SYS INC	46	11	12.75	-0.3	-1.9
N	GOULD INC	34	15	17.50	-2.0	-10.3
N	HARRIS CORP	37	26	31.25	-4.3	-12.0
N	HEWLETT PACKARD CO	50	34	40.63	-0.5	-1.2
N	HONEYWELL INC	87	62	69.13	-3.8	-5.1
N	I8M	162	119	123.00	+0.3	+0.2
O	IPL SYS INC	4	1	2.25	+0.1	+5.9
N	ITT CORP	60	33	52.00	-2.8	-5.0
N	M A COM INC	19	12	12.13	-0.1	-1.0
N	MATSUSHITA ELEC INDL LTD	118	57	107.88	-4.1	-3.7
O	MENTOR GRAPHICS CORP	21	11	16.13	-1.1	-6.5
N	N8I INC	14	8	10.25	+0.3	+2.5
N	NCR CORP	57	37	43.75	-2.3	-4.9
N	PRIME COMPUTER INC	28	16	16.13	+0.3	+1.6
O	STRATUS COMPUTER	26	17	19.00	-2.0	-9.5
O	SYM8OLICS INC	16	4	4.50	+0.0	+0.0
O	TANDEM COMPUTERS INC	40	18	33.75	-2.9	-7.8
N	TANDY CORP	45	31	40.25	-0.3	-0.6
N	TEXAS INSTRS INC	148	101	115.25	-0.8	-0.6
A	ULTIMATE CORP	35	13	17.00	-0.6	-3.5
N	UNISYS	81	58	78.88	+1.6	+2.1
A	WANG LABS INC - 8	23	11	11.75	-0.1	-1.1
A	WANG LABS INC - C	23	11	11.63	-0.4	-3.1
N	XEROX CORP	72	49	56.75	-1.3	-2.2
	SUPPLIES & ACCESSORIES					
N	AMER 8USINESS PROOS	37	25	24.75	-0.8	-2.9
N	8ARRY WRIGHT CORP	25	14	14.63	-0.9	-5.6
A	DUPLEX PRODS INC	23	18	18.75	+0.1	+0.7
N	ENNIS BUSINESS FORMS INC	28	20	25.00	+0.0	+0.0
N	3M CO	116	80	106.50	-5.3	-4.7
N	MOORE LTD	28	19	20.13	-0.6	-3.0
O	STANDARD REGISTER CO	50	32	34.50	-0.5	-1.4
N	WALLACE COMPUTER SVCS	50	37	41.50	-1.5	-3.5

EXCH		52-WEEK RANGE (1)		CLOSE NOV 19 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	SOFTWARE & DP SERVICES					
O	ADVANCED COMP TECH	7	4	4.75	-0.3	-5.0
N	ADVANCED SYS INC	19	12	14.75	-0.6	-4.1
N	AGS COMPUTERS INC	25	17	23.75	-0.5	-2.1
O	AMERICAN MGMT SYS INC	20	11	18.00	-0.5	-2.7
O	AMERICAN SOFTWARE INC	16	9	14.63	-1.1	-7.1
N	ANACOMP INC	7	3	3.50	-0.5	-12.5
O	ANALYSTS INTL CORP	10	4	8.38	-0.4	-4.3
O	ASHTON TATE	43	15	40.63	+0.3	+0.6
O	ASK COMPUTER SYS INC	15	9	12.88	+0.0	+0.0
O	ASTRADYNE COMP IND	3	1	2.34	+0.0	-1.3
N	AUTOMATIC DATA PROC	39	28	34.25	-2.9	-7.7
O	8OOLE & 8ABBAGE INC	7	4	5.75	-0.3	-4.2
O	COMPUTER ASSOC INTL INC	25	14	22.75	+0.0	+0.0
O	COMPUTER HORIZONS CORP	15	10	10.63	-0.8	-6.6
O	COMPUTER NETWORK TECH	10	2	4.25	-0.4	-9.3
N	COMPUTER SCIENCES CORP	40	28	37.25	-2.5	-6.3
O	COMPUTER TASK GROUP INC	19	11	12.50	-0.3	-2.0
O	COMPUTONE SYS INC	6	0	0.50	+0.1	+14.2
O	COMSHARE INC	16	10	14.00	+0.3	+1.8
N	CULLINET SOFTWARE INC	20	6	7.75	-0.8	-8.8
O	CYCARE SYS INC	17	8	8.63	-0.1	-1.4
O	DUQUESNE SYS INC	33	14	31.75	-1.8	-5.2
N	GENERAL ELEC CO	83	64	75.75	-2.5	-3.2
N	GENERAL MTRS CORP	50	30	31.50	-0.6	-1.9
O	HOGAN SYS INC	12	6	10.50	-0.5	-4.5
O	INFORMATION SCIENCES INC	4	1	1.88	-0.1	-6.3
O	INFOTRON SYS CORP	19	8	10.25	-0.3	-2.4
O	KEANE INC	16	6	6.00	+0.0	+0.0
N	LOGICON INC	43	23	23.63	-1.9	-7.4
O	LOTUS DEV CORP	52	20	47.50	-2.3	-4.5
O	MANAGEMENT SCI AMER	16	10	12.63	-1.4	-9.8
O	MCI COMM CORP	13	6	6.38	-0.8	-10.5
O	MICOM SYS INC	23	10	12.25	-1.8	-12.5
O	MICRO PRO INTL CORP	4	2	2.06	-0.2	-8.3
O	MICROSOFT CORP	46	26	42.00	-0.8	-1.8
O	NATIONAL DATA CORP	26	16	21.25	-1.8	-7.6
O	ON LINE SOFTWARE INT	16	6	13.00	-0.5	-3.7
O	ORACLE SYS CORP	29	13	19.00	-1.5	-7.3
N	PANSOPHIC SYS INC	36	21	29.50	-1.8	-5.6
O	POLICY MGMT SYS CORP	24	15	19.75	-0.3	-1.3
O	PROGRAMMING & SYS INC	11	7	8.88	+0.4	+4.4
O	REYNOLDS & REYNOLDS CO	42	22	27.50	-2.0	-6.8
O	SCIENTIFIC COMPUTERS INC	6	4	5.19	-0.4	-7.8
O	SEI CORP	28	15	19.25	-0.4	-1.9
O	SHARED MED SYS CORP	41	29	37.13	-0.5	-1.3
O	SOFTWARE AG SYSTEMS INC	22	15	15.25	-1.1	-6.9
O	SOFTWARE PU8G CORP	10	5	8.00	+0.8	+10.3
A	STERLING SOFTWARE INC	21	9	13.88	-1.5	-9.8
N	SUNGUARD DATA SYSTEMS	16	10	12.50	-1.3	-9.1
N	UCCEL CORP	26	14	23.13	+1.0	+4.5
N	URS CORP	18	10	17.13	+0.4	+2.2
O	VM SOFTWARE INC	32	18	28.00	-0.4	-1.3
	SEMICONDUCTORS					
N	ADVANCED MICRO DEV	34	13	15.25	-0.6	-3.9
N	ANALOG DEVICES INC	25	14	15.00	-1.3	-7.7
O	ANALOGIC CORP	16	10	10.00	-0.9	-8.0
N	APPLIED MAGNETICS CORP	20	13	15.63	+0.5	+3.3
O	AVANTEK INC	23	15	15.50	-1.0	-6.1
O	HADCO CORP	7	3	3.75	-0.1	-3.2
O	INTEL CORP	32	16	20.00	-0.3	-1.2
O	MICRO MASK INC	7	2	2.63	+0.0	+0.0
N	MOTOROLA INC	50	34	35.75	-1.1	-3.1
N	NATIONAL SEMICONDUCTOR	16	8	10.50	-0.6	-5.6
N	TERAOYNE INC	30	16	15.88	-3.3	-17.0

EXCH		52-WEEK RANGE (1)		CLOSE NOV 19 1986	WEEK NET CHNGE	WEEK PCT CHNGE
	PERIPHERALS & SUBSYSTEMS					
A	AM INTL INC	9	5	5.88	-0.3	-4.1
A	ANDERSON JACO8SON INC	3	2	1.63	-0.1	-7.1
O	AST RESH INC	33	11	11.00	-1.1	-9.3
O	AUTOTROL CORP	10	6	6.00	-0.6	-9.4
O	AVANT GARDE COMPUTING	7	3	4.50	-0.5	-10.0
O	8ANCTEC INC	13	6	9.38	-0.8	-7.4
N	8OLT 8ERANEK & NEWMAN	48	30	41.00	-0.3	-0.6
A	CETEC CORP	9	5	5.63	+0.1	+2.3
A	COGNITRONICS CORP	6	2	2.25	-0.3	-10.0
N	COMPUGRAPHIC CORP	29	16	19.00	+0.0	+0.0
N	COMPUTERVISION CORP	19	10	14.13	-0.8	-5.0
N	CONRAC CORP	18	13	13.13	-0.9	-6.3
A	DATAPRODUCTS CORP	18	12	12.25	-0.8	-5.8
A	DATARAM CORP	18	7	6.88	-0.4	-5.2
O	DATA SWITCH CORP	9	5	6.38	-0.3	-3.8
O	DATUM INC	7	4	5.00	+0.0	+0.0
N	DECISION INDS CORP	15	8	9.25	-0.3	-2.6
O	EMC CORP	8	3	6.38	-0.4	-5.6
O	ENDATA INC	18	8	16.00	-1.0	-5.9
O	EVANS & SUTHERLAND	29	18	26.00	-0.3	-1.0
N	FLOATING POINT SYS INC	46	11	12.75	-0.3	-1.9
O	GANDALF TECHNOLOGIES	8	5	6.50	-0.4	-5.5
N	GENERAL DATACOMM IND	15	8	8.63	-0.5	-5.5
N	HAZELTINE CORP	30	16	29.63	-0.1	-0.4
O	ICOT CORP	13	7	9.38	-0.3	-2.6
O	INFORMATION INTL INC	18	12	14.25	+0.0	+0.0
O	INTECOM INC	7	3	5.31	+0.0	+0.0
O	INTERLEAF INC	15	8	11.00	+0.9	+8.6
O	MEGADATA CORP	5	2	2.63	+0.3	+10.5
A	MSI DATA CORP	14	8	12.13	-0.4	-3.0
N	NASHUA CORP	28	13	22.63	-0.6	-2.7
O	NETWORK SYS CORP	25	10	11.88	-1.1	-8.7
N	NORTH AMERN PHILIPS CORP	48	35	39.13	+0.0	+0.0
N	NORTHERN TELECOM LTD	38	25	31.13	+0.0	+0.0
O	NOVELL INC	26	14	23.50	-1.5	-6.0
N	PARADYNE CORP	11	4	4.88	+0.4	+8.3
A	PENRIL CORP	9	5	4.75	-0.1	-2.6
N	PLESSEY PLC	38	22	24.00	-3.0	-11.1
O	PRINTRONIX INC	15	11	11.88	+0.0	+0.0
O	QMS INC	16	8	13.88	-0.5	-3.5
O	RAMTEK CORP	7	3	4.88	+0.1	+2.6
N	RECOGNITION EQUIP INC	17	10	12.25	-1.5	-10.9
O	SCAN TRON CORP	19	10	15.13	-0.9	-5.5
N	SCIENTIFIC ATLANTA INC	15	9	9.25	-0.5	-5.1
O	SEAGATE TECHNOLOGY	19	6	17.25	-0.6	-3.5
N	STORAGE TECHNOLOGY	7	2	2.50	+0.0	+0.0
O	SUN MICROSYSTEM INC	20	11	18.00	-0.3	-1.4
A	T-BAR INC	8	5	6.88	-0.1	-1.8
A	TA8 PRODS CO	15	11	12.25	-0.5	-3.9
O	TANDON CORP	8	2	2.94	-0.6	-16.1
A	TEC INC	8	3	3.75	+0.1	+3.4
N	TEKTRONIX INC	70	50	63.88	-3.5	-5.2
O	TELEVIDEO SYS INC	4	2	2.13	+0.0	+0.0
N	TELEX CORP	69	52	62.13	-3.9	-5.9
N	TIMEPLEX INC	24	14	19.63	-0.9	-4.3
N	TITAN CORP	12	7	6.50	-0.6	-8.8
O	VISUAL TECHNOLOGY INC	1	0	0.59	+0.0	-5.1
O	WYSE TECH	19	11	14.25	-0.9	-5.8
	LEASING COMPANIES					
N	COMDISCO INC	25	12	16.75	-1.6	-8.8
N	CONTINENTAL INFO SYS	12	6	8.38	-0.5	-5.6
O	FINALCO GROUP INC	5	2	2.44	-0.1	-2.5
O	PHOENIX AMERN INC	6	3	4.25	-0.1	-2.9
O	SELECTERM INC	12	5	5.50	+0.0	+0.0
N	U.S. LEASING	46	35	45.00	+0.0	+0.0

EXCH: N=NEW YORK; A=AMERICAN; P=PACIFIC; B=BOSTON;
L=NATIONAL; M=MIDWEST; O=OVER-THE-COUNTER; S=SPLIT

O-T-C PRICES ARE 8ID PRICES AS OF 3 P.M. OR LAST 8ID
(1) TO NEAREST DOLLAR

COMPUTER INDUSTRY

INSIDE

Comshare begins to turn the corner after its transition from a time-share provider to a software vendor/**80**

Terrorist bombing causes more than $1 million in damage to IBM's OSI research center in West Germany/**82**

Japan's MITI tells its chip vendors to halt third-country dumping/**84**

Cullinet remains in the red, loses $5.9 million in quarter/**100**

INSTANT ANALYSIS

"Japanese firms have virtually ignored the anti-dumping elements of this agreement since it was signed nearly four months ago."

— Irwin Federman, Semiconductor Industry Association board chairman and president and CEO of Monolithic Memories, Inc., on the July U.S.-Japan trade agreement

Fred Wang succeeds father

Reorganizes sales division during first day as president

By Clinton Wilder

LOWELL, Mass. — A long-expected industry succession became official last week when Frederick A. Wang was named president of Wang Laboratories, Inc. by his father and the company's founder, An Wang.

With his new position, Fred Wang, 36, adds the company's worldwide sales, marketing and service organizations to his current responsibilities for manufacturing, treasury and research and development. He will retain the title of treasurer.

Fred Wang

On his first day as president, Wang announced a major executive reorganization of the firm's sales organization, naming Ian Diery senior vice-president of U.S. sales and marketing. Diery, head of Wang sales in Europe, replaces Robert L. Doretti, who was named to the new post of senior vice-president for corporate and marketing communications.

Wang said his biggest challenge will be "spreading the message to customers" that Wang Laboratories has the products in place to offer data processing solutions. He was between customer calls in Pennsylvania when interviewed by *Computerworld* last week.

"When I was younger, I knew that this was the type of role I would like to play in the company," he said of the president's position. "I always hoped they would put me in the positions that are most useful to the company, and I think I am the right person for the right spot."

Wang Labs has yet to recover from its devastating slump in 1985, and Wang believes the company is unfairly saddled with a reputation

See **FRED** page 100

Toshiba, Motorola join forces

By Takehisa Kondoh

TOKYO — Toshiba Corp. is negotiating a deal with Motorola, Inc. to establish a joint venture in Japan in early 1987 to build and market microprocessors and super-memory chips.

Under the agreement, Schaumburg, Ill.-based Motorola is offering to separate its Memory Division and establish a new firm to be jointly run by Toshiba. Toshiba will be investing approximately $186 million in the venture.

Toshiba would not divulge details of the talks, which reportedly began at Motorola's request earlier this year. Production under the agreement would focus on the 1M-bit dynamic random-access memory (RAM) chip. Also targeted would be 32-bit microprocessors.

Industry observers believe Motorola sought the arrangement in an attempt to complement its relatively weak memory sector. Toshiba is one of the leading vendors of 1M-bit dynamic RAM chips.

Motorola would offer a reliable source of microprocessor expertise to Toshiba, helping to diversify its microchip business. Motorola's 1985 semiconductor revenue, reaching $1.73 billion, came largely from discrete chips and microprocessors.

While the other recession-hit Japanese chip vendors — including NEC Corp., Hitachi Ltd. and Fujitsu Ltd. — elected to scale down their semiconductor production this year, Toshiba alone is stepping up both manufacturing and production and exports, projecting a 1986 semiconductor output valued at $2.7 billion.

A source close to Toshiba noted that the joint venture would be targeted at the Japanese and South Asian markets. Toshiba is expected to use its own domestic sales channels for Japanese markets.

Separately, Japanese semiconductor maker Mitsubishi Electric Corp. an-

See **TOSHIBA** page 84

INDUSTRY INSIGHT
Bob Djurdjevic

Software prices rising up curve

For centuries, people believed the world was flat. Now we are equally convinced it is round. A similar phenomenon is discernable in the computer industry.

For decades, people believed the money was in hardware. Now we are about to change our minds about that, too.

No wonder everybody got the impression that it was the hardware that mattered. Not long ago, the software was free, whereas the hardware was very expensive. Now the tables are turning. In some cases, IBM's systems software fees alone, not to mention the cost of application programs, are already comparable to the prices of hardware.

One can naturally wonder, therefore, whether we may see the day when the vendors start giving free hardware in order to attract users to their expensive software.

Take the intermediate systems market, for example. At the start of the decade, the 4341 Model 2 was IBM's largest mid-size 370-architecture mainframe. The state-of-the-art operating system was DOS/VSE, whose price accounted for about 9% of a user's total three-year operating costs.

Today, the 4381 Model 14 has the pole position among IBM's mid-size CPUs. The DOS users are being lured by IBM to migrate to MVS/XA through such special offerings as the XA Ex-

See **SOFTWARE** page 84

Djurdjevic is a computer industry analyst and president of Annex Research, a Phoenix-based computer research and consulting firm.

Ashton-Tate diversifications help third-quarter profit jump

By James A. Martin

TORRANCE, Calif. — Ashton-Tate continued along a strong growth pattern, according to financial results released last week. The micro software vendor posted third-quarter earnings of $7.9 million, up 65% from the $4.8 million reported for the same quarter last year.

The increase was attributed to the success of Ashton-Tate's Dbase III Plus data management application and the company's continued diversification into new markets, according to industry analysts.

"The micro market has been accelerating lately, and that's a big plus for all leading micro software companies," said William Shattuck, software analyst with San Francisco-based Montgomery Securities. "In addition, the data base software market for micros has not been penetrated as spreadsheet and word processing have, and more and more users are requiring those kind of sophisticated programs."

Although Ashton-Tate can expect a growth rate of up to 75% for fiscal 1986, that rate is expected to drop to 30% next year, in line with the micro software market, Shattuck said. However, if the company continues to acquire, as it has with Multimate International Corp. and Decision Resources, Inc., then its growth rate will remain higher than average.

See **ASHTON** page 86

HP gains in fourth quarter

Sees 15% rise in sales, 23% climb in earnings

By James A. Martin

PALO ALTO, Calif. — Hewlett-Packard Co. last week concluded its fourth quarter and 1986 fiscal year with modest gains in sales and income.

Fourth-quarter sales were $1.93 billion, a 15% increase from the $1.7 billion recorded during the same quarter in 1985. Net earnings were $157 million, or 62 cents per share, a 23% rise from $127 million, and 50 cents per share, a year ago.

Separately, the company said it has become a shareholder in Microelectronics and Computer Technology Corp., an Austin, Texas, research consortium. HP acquired the share previously owned by BMC Industries, Inc. in St. Paul, Minn.

HP closed the books on fiscal 1986 with sales of $7.1 billion, compared with $6.5 billion in fiscal 1985. Net earnings were $516 million, or $2.02 a share, compared with $483 million and $1.91 a share.

"Overall, it was a disappointing year, and the company has not really grown much in the past two years," said Richard C. Billy, minicomputer analyst with Gartner Securities in Stamford, Conn. "Their growth has been less than 20% in the past two years, and their computer line is rather aged."

The company also said it began shipping the first of its Spectrum series, the HP 9000 Model 840, one month ahead of schedule.

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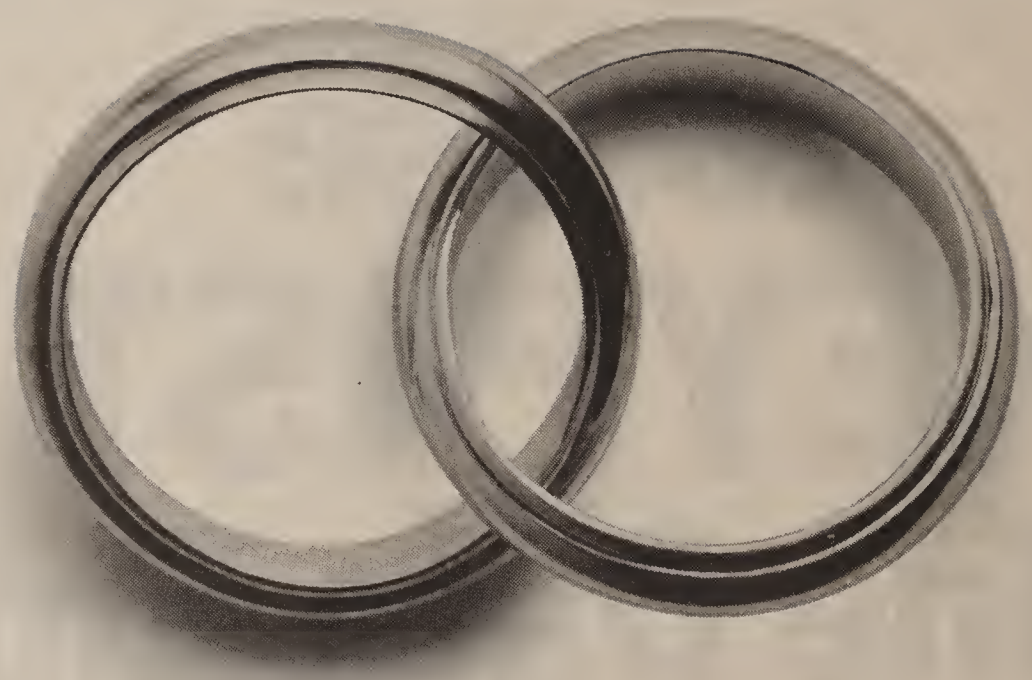

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